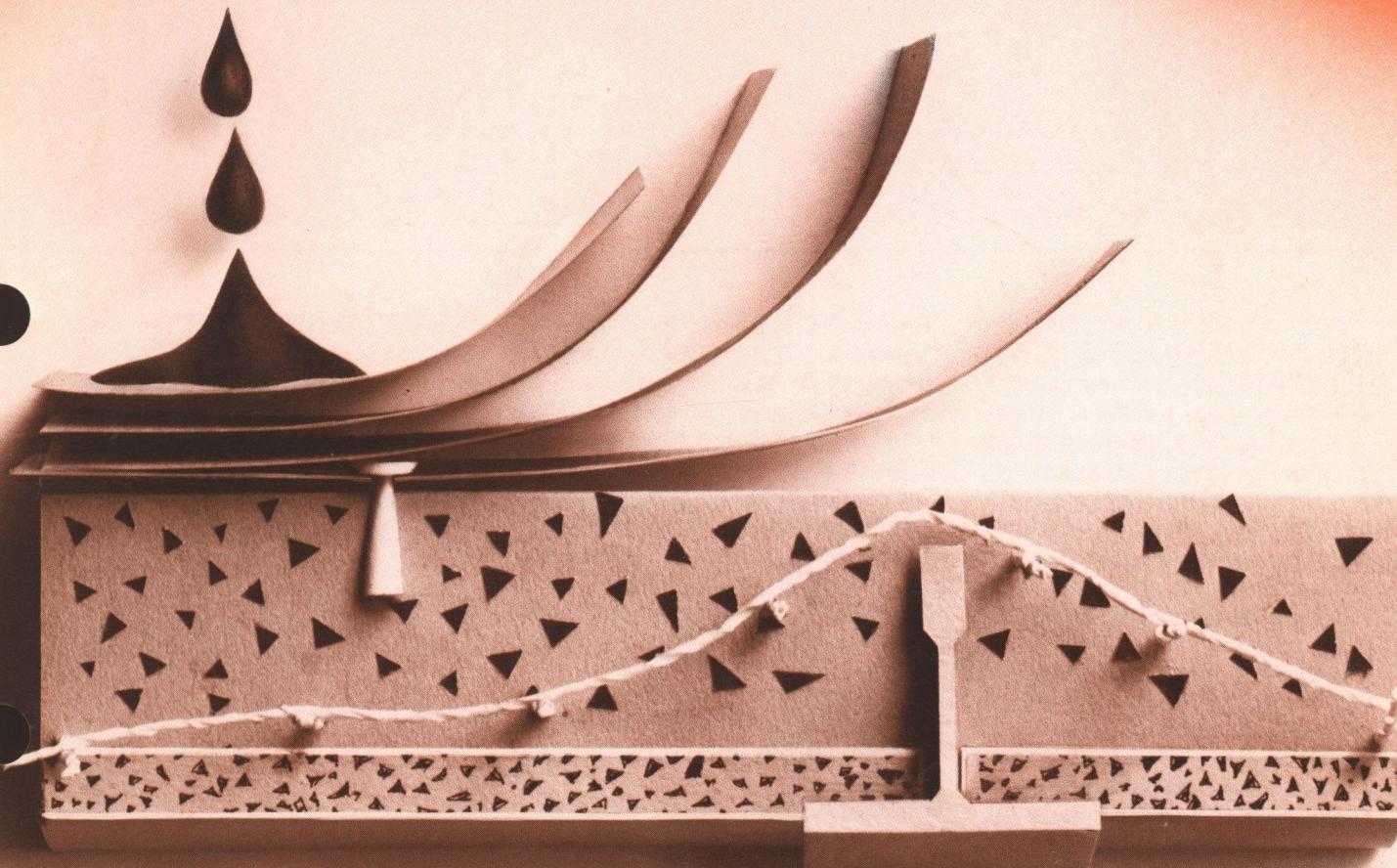


MANUFACTURER'S
RECOMMENDATIONS FOR

BUILT-UP ROOFING

with PYROFILL® and THERMOFILL®
gypsum concrete roof decks

UNITED STATES GYPSUM

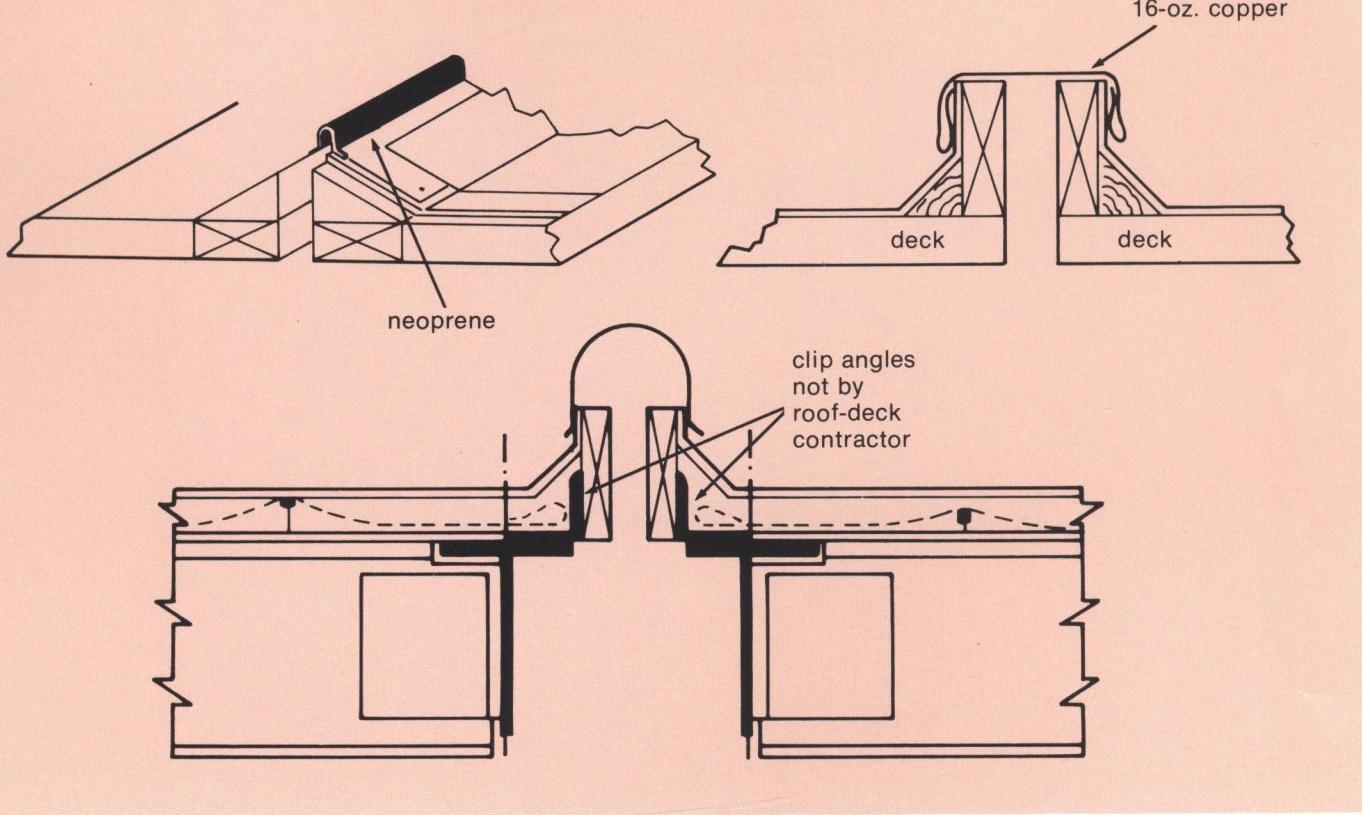


GYPSUM FEARS NO FIRE



UNITED STATES GYPSUM
1976-12
3 P
CEMENTitious DECK
poured gypsum deck

CONTROL JOINTS THRU DECK & FRAMING



DECK AND STRUCTURE REQUIREMENTS

Weathertight built-up roofing coverings begin with good structural design. This should include:

- Adequate control joints in the building framework and roof deck.
- Adequate camber and slope (min. 1/4 in.) to prevent ponding.
- Provisions for movement in the deck due to rotational forces as well as horizontal and vertical shear.
- Ventilation to dry the slab and prevent condensation during occupancy.

To protect the weathertight integrity of roofing coverings, a properly designed roof deck must possess:

- Dimensional integrity during fire exposure.
- Ample safety factors to protect against impact loads.
- Minimum live-load deflection to keep stress off roof-covering materials.
- Resistance to cracking from thermal contraction.

Roof decks of poured PYROFILL or THERMOFILL Gypsum Concrete and precast USG® Metal Edge Gypsum Plank—when designed and installed to meet U.S.G. specifications—have all the properties required for a sound roof covering including those systems with insulation and gravel surfacing applied over the roofing membrane.

Gypsum concrete roof decks, like all roof decks, are subject to expansion and contraction due to temperature changes. Sub-purlins welded to steel framing limit slab movement at right angles to the sub-purlins. In addition, control joints are required as follows:

- Located in the deck and roofing wherever they occur in the main structure. In long, narrow buildings, space control joints not more than 200 ft. apart.
- To separate wings of "L"-, "U"- and "T"-shaped buildings with control joints.
- At all structural roof penetrations and at walls crossing ends of sub-purlins, mineral-fiber filler strips should be installed.

To resolve specific problems, coefficients of linear expansion should be considered. They are: for gypsum

concrete, .0000085 in./in./F°; for steel, .0000065 in./in./F°. See the AISC Steel Construction Manual for method of calculating expansion of bodies by heat.

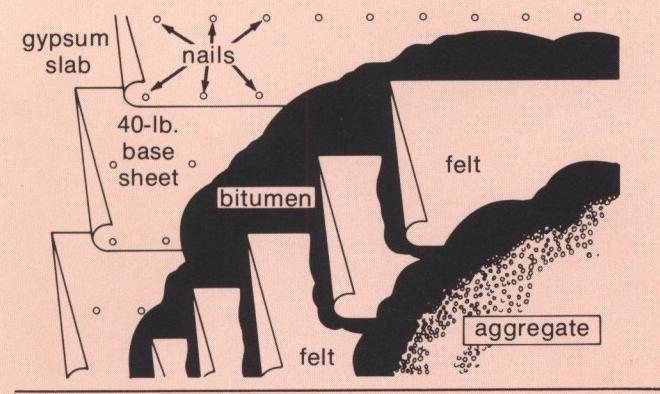
DECK PROTECTION

Construction Loads: Care should be taken to avoid loads that exceed design limits in framing and deck systems. Heavy roofing equipment can impose concentrated loads in excess of reasonable roof design loads. Since U.S.G. cannot be held responsible for deck fractures from overloading, the following preventive measures should be taken:

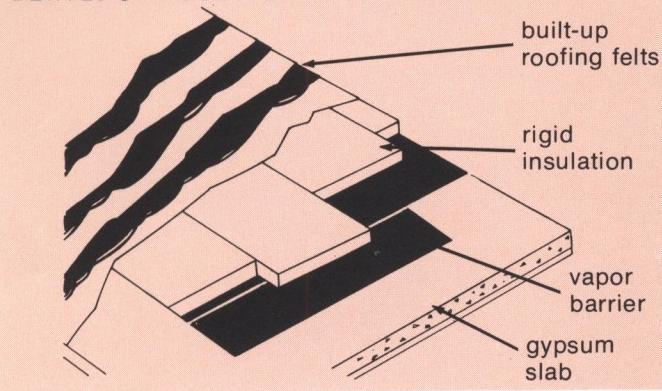
- Place planking over deck at hoists or crane unloading areas.
- Distribute wheel or point loads with temporary planking laid as runways or sills.
- Do not store heavy materials on the deck in concentrated stacks.

Note: Consult job architect or engineer to determine maximum allowable limits for static and dynamic loads on the deck.

RECOMMENDED PROCEDURE FOR BUILT-UP ROOFING.



DETAILS OF INSULATION AND VAPOR BARRIER.



SCHEDULING

Since gypsum slabs are designed to dry through vapor-permeable formboards, it is not necessary to delay roof application after deck is poured and set. In fact, it is U.S.G.'s recommendation that roofing be applied not later than two days after the slab has been poured. However, following periods of inclement weather, all accumulations of snow or ice must be removed before roofing is applied. Immediate roof application assures a satisfactory underside deck appearance and allows roofing nails to develop optimum nail-holding power.

For proper scheduling, representatives of the general contractor, roof-deck contractor and roofing contractor should meet before the deck is poured and agree to coordination of operations to insure that deck will be roofed within 48 hr. after pouring.

INSPECTION

Representatives of the roofing contractor and roof-deck contractor should inspect the deck immediately after completion to determine that it is satisfactory and ready for roof application to begin.

BUILT-UP ROOFING REQUIREMENTS

Roofing membranes applied to the deck usually experience more severe temperature ranges than the deck itself. The expansion coefficients for roofing materials at low temperatures are greater than for roof decking materials. During temperature cycles, the roofing membrane expands and contracts faster than the roof deck. For these reasons it is important not only to have a sound roofing base, but also a good roofing system installed properly to assure minimum roofing maintenance for the life of a building.

Since roofing bonds and guarantees cover performance of roofing materials when they are applied in strict accordance with the manufacturer's specifications, the ultimate decision

MAXIMUM WHEEL LOADS—GYPSUM CONCRETE DECKS

wheel tread width (in.)	approx. contact area (in.)	wheel spacing (in.)	max. load per axle (lb.)
2	3.14	over 10	900
		under 10	840
4	12.57	over 16	1320
		under 16	860
6	28.27	over 32	1680
		under 32	1000
8	50.27	over 32	1720
		under 32	1000

for installation lies with the roofer. Most major roofing manufacturers are in agreement with U.S.G. recommendations for application over poured gypsum decks.

RECOMMENDED ROOFING PROCEDURES

Felt and Bitumen

First course of roofing felt should be a minimum 40-lb. coated base sheet applied with long dimension parallel to sub-purlins.

Unlike saturated felt, coated base sheet will not wrinkle from contact with a moist deck, nor does hot-mopping over coated base sheet melt the impregnated bitumen, leaving spot or strip-mopping effects. Also, coated base sheets block objectionable odors of some bitumens.

Base sheets should be nailed dry to the gypsum deck using E-S NAIL-TITE nails with attached metal cap (see nail-holding chart, next page). Nailing pattern must comply with built-up roofing material manufacturer's specification. Nailing provides quick, positive attachment, isolates the roofing from localized slab movement

NAIL-HOLDING POWER (lb.)

nail used	PYROFILL Gypsum Concrete			THERMOFILL Gypsum Concrete		
	removal —1 day	removal —7 days	removal —slab dry	removal —1 day	removal —7 days	removal —slab dry
1½" ES NAIL-TITE ⁽¹⁾ —plain finish (1¼" penetration)	67 ₍₂₎	77	136	60 ₍₂₎	67	141

Resistance to direct pull in lb., for nails placed 24 hr. after pouring slab. Test slabs had 2" min. thickness and dry density of 48 pcf for PYROFILL and 38 pcf for THERMOFILL Gypsum Concrete. Nail-holding power decreased at densities less than those cited.

(1) Manufactured by E.S. Products, New Rochelle, N.Y., and recommended for smoothcoat-type roofing.

(2) Provides min. 40-lb. immediate holding power required by roofing manufacturers.

and permits lateral dissipation of vapor pressure.

Succeeding plies are applied in strict accordance with the mopping procedure specified by the built-up roofing material manufacturer. Bitumen must be applied over a dry, clean surface. Felts must be brushed down flat and smooth for continuous contact.

Final flood-coat of bitumen should be heavier than that used for felts to insure adequate embedment of aggregate. Aggregate should be dry to prevent bubbling and foaming of bitumen. Rate of application generally is 300 to 400 lb. aggregate per square.

Insulation

Thermal insulation, if required, should be applied according to manufacturer's directions. Gypsum decks are ideally suited to conventional application of insulation beneath the roof covering or newer application with insulation and gravel surfacing over the waterproof membrane.

Vapor Barrier

The use of a vapor barrier should be determined by a mechanical engineer's study involving interior and exterior conditions and materials used in construction. Indiscriminate use of a vapor barrier is not recommended.

Notes:

- a. Wherever a control joint is provided in the structure or deck, a control or slip joint must be installed in the built-up roofing. Installation must be in accordance with the roofing manufacturer's specification.
- b. Flashings, etc., must be attached to components other than the gypsum slab.
- c. Wood nailers must be used where there are no parapets.
- d. Use of self-locking nails around perimeters, overhanging eaves and monitors provides excellent protection at areas where windstorms exert maximum uplift.

and from materials wet by rain and/or condensation. Fresh air ventilation needed to carry out water vapor should be provided by:

- a. Leaving windows open (close soffits last).
- b. Ventilators built into plenum.
- c. Temporary fans.

Formboard Painting

Use only nonbridging type paints fortified with a suitable mildew inhibitor as recommended by paint manufacturer. All exposed roof framing must have an unbroken film of metal-primer paint. Apply roof deck paint after the formboard and slab have thoroughly dried.

Note: Coordinate other trade installations to assure maximum building drying time. Refer to U.S.G. Technical Folders IR-159 Drying and Ventilation, and IR-158 Painting, for complete information on these important aspects of roof-deck construction.

AFTER-INSTALLATION RECOMMENDATIONS

Ventilation

Adequate heat and ventilation are necessary for removal of construction moisture emitting from concrete floors, masonry walls, deck,

UNITED STATES GYPSUM

BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

SHEETROCK Regular & FIRECODE Gypsum Panels

**quality interior wall and ceiling
surfaces at low cost**

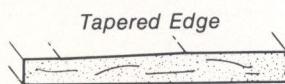
- Fire-resistant dry construction
- Quick erection and decoration
- Resist cracking and warping
- Specialized types for all systems

DESCRIPTION

In the building industry, SHEETROCK Gypsum Panels are so widely known that some users mistakenly call any gypsum drywall panel "SHEETROCK". This widespread recognition is solidly based on these actual facts:

SHEETROCK is the original, and still the preferred and most widely used brand of gypsum panel in existence. It is available in more specialized forms for various systems than any other drywall line—system-designed for lowest in-place cost. Its high quality standards extend to a complete line of U.S.G. components supplied for fast-applying, high-performance walls and ceilings. Thus, one dependable source offers unit responsibility for the system used.

SHEETROCK is a mill-fabricated gypsum panel composed of a fireproof gypsum core encased in a heavy natural-finish paper on the face side and a strong liner paper on the back side. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square-cut and finished smooth. Long edges of panels are tapered, allowing joints to be reinforced and concealed with a U.S.G. joint treatment system.



Available in two types for standard construction uses:

SHEETROCK Regular Panels, in four thicknesses for specific purposes—

— $\frac{5}{8}$ ", recommended for the finest single-layer drywall construction. The greater thickness provides increased resistance to fire exposure and transmission of sound.

— $\frac{1}{2}$ ", for single-layer application in residential construction.

— $\frac{3}{8}$ ", lightweight, applied principally in the double wall system over wood framing and in repair and remodel work.

— $\frac{1}{4}$ ", a lightweight, low-cost, utility gypsum panel, used as base layer for improving sound control in double-layer steel and wood stud partitions and for use over old wall and ceiling surfaces.

SHEETROCK FIRECODE Gypsum Panels, made in $\frac{5}{8}$ " and $\frac{1}{2}$ " thicknesses, provide additional fire resistance—the result of a specially formulated mineral core.

Systems using SHEETROCK FIRECODE "C" Gypsum Panels have qualified for fire ratings of up to 2 hours in walls, 3 hours in ceilings, 4 hours for column protection.

ADVANTAGES

Dry construction. Mill-fabricated gypsum panels eliminate excessive moisture in construction.

Low in-place cost. The easily-cut gypsum panels apply quickly, permit painting or other decoration, and the installation of metal or wood trim, almost immediately.

Fire protection. The gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F. until completely calcined—a slow process.

Crack resistance. With joints reinforced by one of the U.S.G. joint systems, SHEETROCK Gypsum Panels form walls and ceilings exceptionally resistant to cracks caused by structural, thermal and hygrometric changes.

Non-warping. Expansion or contraction under normal atmospheric changes is negligible and does not cause harmful warping or buckling.

LIMITATIONS

1. Not recommended for use where exposure to moisture is extreme and continuous.

2. In order to attain fire-resistance ratings, the construction of partition and/or floor-ceiling assemblies must conform to the panel designs shown in the test report.

3. To prevent objectionable sag in ceilings, weight of overlaid unsupported insulation should not exceed 1.2 lb./ft.² for $\frac{1}{2}$ -in. thick panels with frame spacing 24 in. o.c.; 2.0 lb./ft.² for $\frac{1}{2}$ in. panels with frame spacing 16 in. o.c. and for $\frac{5}{8}$ -in. panels 24 in. o.c. A vapor barrier should be installed in exterior ceilings, and plenum or attic space properly vented.

4. Maximum spacing of frame members for single layer, new, wood-frame construction:

thickness	location	application method (1)	max. frame spacing o.c.
$\frac{5}{8}$ "	ceilings (2)	perpendicular (3)	16"
	sidewalls	parallel or perpendicular	16"
$\frac{1}{2}$ "	ceilings	parallel (3)	16"
	sidewalls	parallel or perpendicular	24" (4)
$\frac{3}{8}$ "	ceilings	parallel or perpendicular	24"
	sidewalls	parallel or perpendicular	24"
	sidewalls	parallel or perpendicular	24"

(1) Long edge relative to framing. (2) Not recommended below unheated spaces.

(3) Not recommended if water-based spray-texture finish is used. (4) Max. spacing 16" for water-based spray-texture finish application.

UNITED STATES GYPSUM

SHEETROCK Regular & FIRECODE Gypsum Panels

ARCHITECTURAL SPECIFICATIONS

notes to architect

These are abbreviated specifications for regular and fire-rated gypsum panels. For additional information and complete specifications, see U.S.G. Architectural Technical Folders SA-923, 924 & 927.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. Gypsum Panels (in lengths as long as practical to minimize number of joints):

(SHEETROCK Regular, FIRECODE, FIRECODE "C")
Gypsum Panels (thickness).

Part 3: execution

3.1 gypsum panel application

a. Position all ends and edges of all gypsum panels over framing members, except when joints are at right angles to framing members as in perpendicular application.

b. Apply SHEETROCK Panels first to the ceiling and then to the walls. Extend ceiling board into corners and make firm contact with top plate. To minimize end joints, use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.

c. Attach panels to framing supports by: (Standard Single Nailing Method) (Adhesive-Nail-On Method) (Double Nailing Method) (Power-driven USG Screws). Space fasteners not less than $\frac{3}{8}$ " from edges and ends of panels and drive as recommended for specified fastening method. Drive

fasteners in field of panels first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.

d. Install trim at all internal and external angles formed by the intersection of gypsum panel to other surfaces. Apply corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions. Treat fasteners and joints per manufacturer's directions.

PRODUCT DATA

U.S.G. Gypsum Panels Availability

Thickness (1)	Core Type			Foil-Back Option	Lengths (ft.)				
	(2)	(3)	(4)		8	9	10	12	14
Reg.	FC	FC "C"							
1/4"	X				X		X		
3/8"	X			X	X	X	X	X	X
1/2"	X		X	X	X	X	X	X	X
5/8"	X	X	X	X	X	X	X	X	X

(1) All boards 4-ft. width; (2) Regular; (3) FIRECODE; (4) FIRECODE "C".

Weights (approx.) Lb./MSF

Thickness	Reg. Core (1)	FIRECODE & "C" Cores
1/4"	1,200	—
3/8"	1,450	—
1/2"	1,760	1,990
5/8"	2,310	2,420

Compliance with standards: Meet Federal Specification SS-L-30D; ASTM C36-76.

Thermal coefficient of expansion (unrestrained): 9.0×10^{-6} in. per in. per deg. F. (40°—100°F.).

Hygrometric coefficient of expansion (unrestrained): 5.4×10^{-6} in. per in. per % r.h. (5%—90% r.h.)

Fire hazard classification: Flame spread 15, fuel contributed 15, smoke developed 0.

Packaging: 2 panels per bundle.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE.

UNITED STATES GYPSUM
BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

Foil-Back SHEETROCK Gypsum Panels

**control moisture in exterior walls
with built-in vapor barrier**

- Reduce in-wall condensation
- Wall surface and vapor barrier in one quick operation
- Lower in-place cost than separate film barrier
- Provide reflective insulation value with air space

DESCRIPTION

Foil-Back SHEETROCK Gypsum Panels come with kraft-backed aluminum foil securely bonded to the back surface with high-strength adhesive. Used in new construction and remodeling, the smooth, bright surface of these panels acts as a vapor barrier to prevent interior moisture from passing into the outside wall stud-space where condensation can cause problems.

Foil-Back SHEETROCK is effective as a vapor barrier for exterior walls and ceilings when applied with foil surface next to framing in single-layer application, or as base layer in the double-layer system. Important thermal insulating value is achieved with SHEETROCK installed with aluminum foil facing an air space of min. 3/4 in.

Regular Foil-Back SHEETROCK Panels with tapered edges are available in 3/8-in., 1/2-in. and 5/8-in. thicknesses. Providing additional resistance to fire exposure, Foil-Back SHEETROCK FIRECODE Panels with tapered edges are available in 5/8-in. thickness; Foil-Back SHEETROCK FIRECODE "C" Panels with tapered edges are available in 1/2-in. and 5/8-in. thicknesses; special order only.

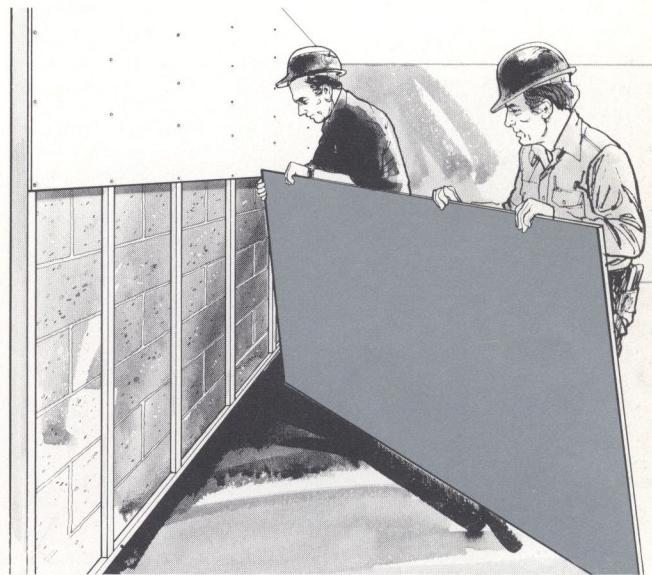
ADVANTAGES

Controls moisture. Foil-Back SHEETROCK provides an effective vapor barrier that helps prevent interior moisture from entering stud spaces and exterior walls. It also helps maintain comfortable room humidity year-round.

In actual tests, with the outside temperature at 10°F. and the inside temperature at 70°F. with 45% relative humidity, Foil-Back SHEETROCK Panels reduced the volume of in-wall condensation from 20 pints to two-thirds pint per day.

Insulates against heat and cold. The aluminum-foil surface also reflects radiant heat rays originating inside and outside the building. Tests have shown that Foil-Back SHEETROCK facing an air space in walls supplies insulating efficiency equal to resistance value advantage of 2.80. Result: reduced winter heat loss, plus lower summer temperatures and reduced air-conditioning load.

Reduces in-place cost. Actual in-place cost of Foil-Back SHEETROCK Panel installation averages \$3.00 less per thousand sq. ft. than with standard panels and a polyethylene-film barrier installed separately.



Simple application. Easy-to-handle Foil-Back SHEETROCK Panels are adaptable to virtually all exterior wall construction—wood frame, steel frame, furred masonry. Application is identical to standard panels, including adhesive attachment with U.S.G. Construction Adhesives.

limitations

1. Not recommended for use where exposure to moisture is extreme and continuous.
2. Not to be used as a base for ceramic or other tile or as a base layer for TEXTONE Vinyl-Faced Panels in double-layer assemblies.
3. To attain fire-resistance ratings, construction of partition and/or floor-ceiling assemblies must conform to designs as tested at the indicated fire testing facilities.
4. Maximum spacing of frame members for single layer, new, wood-frame construction:

thickness	location	application method	max. frame spacing o.c.
3/8"	ceilings sidewalls	perpendicular vertical or horizontal	16" 16"
1/2"	ceilings ⁽¹⁾ sidewalls	perpendicular vertical or horizontal	24" 24"
5/8"	ceilings sidewalls	perpendicular vertical or horizontal	24" 24"

(1) If water-based spray texture finish is used, max. frame spacing is reduced to 16" o.c.

UNITED STATES GYPSUM

Foil-Back SHEETROCK Gypsum Panels

ARCHITECTURAL SPECIFICATIONS

notes to architect

These are abbreviated specifications for Foil-Back SHEETROCK Gypsum Panels. For additional information and complete specifications, see U.S.G. Architectural Technical Folders SA-923, 924 & 927.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. Gypsum Panels (in lengths as long as practical to minimize number of joints):

(Foil-Back SHEETROCK, FIRECODE, FIRECODE "C") Gypsum Panels (thickness).

Part 3: execution

3.1 gypsum panel application

3.1.1 basic single-layer system, treated joints

a. Position all ends and edges of all gypsum panels over nailing members, except when joints are at right angles to framing members as in horizontal application or when end joints are backblocked.

b. Apply SHEETROCK Panels first to the ceiling and then to the walls with foil surface facing a 3/4-in. min. air space. Extend ceiling board into corners and make firm contact with top plate. To minimize end joints, use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.

c. Attach panels to framing supports by: (Standard Single Nailing Method) (Adhesive—Nail-On Method) (Double Nailing Method) (Power-driven USG Brand Screws). Space fasteners—not less than 3/8" from edges and ends of panels and drive as recommended for specified fastening method.

Drive fasteners in field of panels first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.

d. Install trim at all internal and external angles formed by the intersection of either gypsum panel surfaces or other surfaces. Apply corner bead to all vertical or horizontal external corners, treat panel joints and fasteners in accordance with manufacturer's directions.

PRODUCT DATA

Materials: Panels with gypsum core, paper-encased, aluminum foil-backed.

Sizes: Foil-Back SHEETROCK Regular

8, 9, 10, 12 or 14 ft. x 3/8 in., 1/2 in. or 5/8 in.

Foil-Back SHEETROCK FIRECODE

8, 9, 10, 12 or 14 ft. x 5/8 in.

Foil-Back SHEETROCK FIRECODE "C"

8, 9, 10, 12 or 14 ft. x 1/2 in. or 5/8 in.

Widths: 4 ft.

Edges: Tapered.

Face Finish: Ivory Manila.

Weights: Approx. wt., lb./MSF: Foil-Back SHEETROCK Regular—1,500 (3/8-in.), 1,900 (1/2-in.), 2,400 (5/8-in.); Foil-Back SHEETROCK FIRECODE—2,475 (5/8-in.); Foil-Back SHEETROCK FIRECODE "C"—1,975 (1/2-in.), 2,475 (5/8-in.).

Compliance with standards: Meets Federal Specification SS-L-30D, also ASTM C36 including requirements for vapor permeability not exceeding 0.30 perm.

Thermal resistance values:

Foil-Back SHEETROCK Regular⁽¹⁾

thickness	1/2"	5/8"
wall application	3.93	4.04
ceiling application		
summer conditions	4.92	5.03
winter conditions	2.73	2.84

(1) Resistance based on inside still air film, panel thickness and one reflective surface facing a 3/4" min. still air space.

Fire hazard classification: flame spread 15, fuel contributed 15, smoke developed 0.

Packaging: 2 panels per bundle.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: SHEETROCK, FIRECODE, TEXTONE.

UNITED STATES GYPSUM
BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

USG Exterior Gypsum Ceiling Board

for low-cost exterior ceilings—smooth, durable, fire-resistant

- Lowest installed cost of all common soffit materials
- Resists sagging, warping better than plywood, fiberboard
- Fire-resistant dry construction
- Monolithic surfaces, outstanding durability
- Attractive appearance, easily decorated

DESCRIPTION

This sturdy, weather-resistant material is used for sheltered exterior ceiling areas in new construction and remodeling applications over wood or steel framing. Besides offering low in-place cost, USG Exterior Gypsum Ceiling Board offers important advantages over more costly exterior grade plywood, structural laminated fiberboard and portland cement plaster.

Noncombustible, moisture- and sag-resistant, this special gypsum board provides splinter- and grain-free surfaces that decorate easily and hold their beauty. Joints can be finished to provide smooth, monolithic look. Or H-mouldings or battens can be used over butt joints for fast installation and a paneled appearance.

Commercial applications include large canopies and covered walkways, malls and parking areas. In residences, USG Exterior Gypsum Ceiling Board is recommended for open porches, breezeways, carports and exterior soffits.

Available in several thicknesses for standard construction uses: ½-in. regular USG Exterior Gypsum Ceiling Board, 5/8-in. FIRECODE and ½- and 5/8-in. FIRECODE "C" Ceiling Board for additional resistance to fire exposure. Ceiling assemblies with FIRECODE "C" Board have qualified for fire ratings of up to 3 hours.

ADVANTAGES

Low in-place cost. Exceptional savings are possible with USG Exterior Gypsum Ceiling Board—the least expensive to buy and apply of all comparable commonly used materials. In-place cost is less than for exterior grade plywood, laminated fiberboard and portland cement plaster. An independent construction cost survey⁽¹⁾ documented large savings on both material and labor when compared to cement plaster soffits. Actual installed cost of 74¢ per sq. ft. for USG Exterior Gypsum Ceiling Board compared with \$1.80 per sq. ft. for portland cement plaster—savings of \$1.06 per sq. ft.

Sag and warp-resistant. USG Exterior Gypsum Ceiling Board resists deflection far better than plywood or fiberboard after repeated exposure to wet-dry cycles. The gypsum core of this board contains special additives to resist sagging; sturdy face and back paper are chemically treated to repel moisture.

Splinter-free, grain-free USG Ceiling Board in entryway.



Quick, dry installation. All the speed and economy of regular drywall construction are offered by USG Exterior Gypsum Ceiling Board: quick score-and-snap cutting... no sawing or special tools needed...rapid screw or nail attachment...openings simply made where and when required, during or after application...furring and trim common to conventional construction...fire-resistant materials. Result: fast, high quality application.

Strong, monolithic joints. Special eased edges minimize ridging and beading for smooth, sturdy joints when finished to provide an attractive monolithic surface easy to maintain. DURABOND XL Joint Compound is specially formulated for this exterior application.

Fire-resistant. The noncombustible gypsum core in USG Exterior Gypsum Ceiling Board adds fire safety to every installation. Ceiling assemblies qualify for 1, 2 and 3-hr. fire ratings.

Easily decorated. Accepts primer and paint with uniform suction—no bond failure, blistering or peeling. Grain-free, splinter-free surfaces stay attractively smooth.

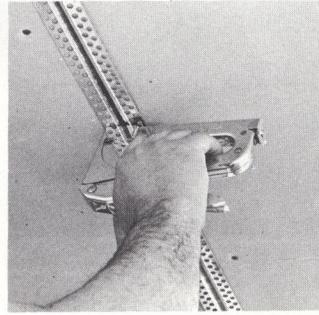
Limitations

1. Must be protected from direct exposure to weather.
2. To attain fire-resistance ratings, construction of ceiling assemblies must conform to the panel designs as tested at the indicated fire-testing facilities.
3. Maximum spacing of frame members: 24" o.c.

UNITED STATES GYPSUM

USG Exterior Gypsum Ceiling Board

Ceiling Board is applied, finished quickly over wood or steel framing using common tools.



ARCHITECTURAL SPECIFICATIONS

notes to architect

These are abbreviated specifications for USG Exterior Gypsum Ceiling Board. For additional information and complete specifications, see U.S.G. Architectural Technical Folders SA-923, 924 & 927.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

If joints of USG Exterior Gypsum Ceiling Board are to be treated with DURABOND XL Compound, air temperature during application should be 45°F. min. Cross-ventilation shall be provided for each enclosed space between the roof and ceiling board. Minimum ventilation should be one sq. ft. for each 150 sq. ft. of ceiling board.

Part 2: products

2.1 materials

a. USG Exterior Gypsum Ceiling Board (FIRECODE ("C")) (1/2") (5") thick, 4 ft. wide, (8-ft.) (12-ft.) lengths.

b. DURABOND XL Joint Compound (PERF-A-TAPE Reinforcement).

c. Fasteners, trim, control joints and other accessories (specify as required).

d. H-mouldings or battens (obtain locally).

Part 3: execution

3.1 exterior ceilings and soffits

Apply USG Exterior Gypsum Ceiling Board (horizontally) (vertically) with end joints over supports and with 1/16" to 1/8" space between butted ends of boards. Use maximum practical lengths to minimize end joints. Fasten boards to supports with screws spaced 12" o.c. or nails spaced 8" o.c. Where specified, cover joints with wood battens securely fastened to framing. Install control joints, finish joints, trim and fasteners with exterior joint system applied according to manufacturer's directions.

PRODUCT DATA

Materials: Panels with gypsum core, paper-encased.

Sizes: USG Exterior Gypsum Ceiling Board Regular
8 or 12 ft. x 1/2 in.

FIRECODE
8 or 12 ft. x 5/8 in.

FIRECODE "C"
8 or 12 ft. x 1/2 in. or 5/8 in.

Widths: 4 ft.

Edges: Eased.

Face Finish: Water-repellent beige paper.

Weights: Approx. wt. lb./MSF: Regular—2,000 (1/2-in.); FIRECODE—2,500 (5/8-in.); FIRECODE "C"—2,000 (1/2-in.), 2,500 (5/8-in.).

Compliance with Standards: Meets ASTM C36.

Fire Hazard Classification: Flame spread 20, fuel contributed 5, smoke developed 0.

Packaging: 2 panels per bundle.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, DURABOND, FIRECODE, PERF-A-TAPE.

UNITED STATES GYPSUM

BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

USG® Triple-Sealed Gypsum Sheathing

**lowest-cost structural sheathing—
top-quality performance**

- costs less—most economical of any on market
- lightweight—only 1-2/3 lbs. per sq. ft.
- cuts easily—simply score surface and snap
- water-repellent paper—stores outdoors
- needs no corner bracing—meets HUD requirement with adhesive at corner panels only
- Code approvals—ICBO, BOCA, SBCC

DESCRIPTION

USG Triple-Sealed Gypsum Sheathing is a weather- and fire-resistant board specially designed to combine outstanding performance with exceptional economy. Used in wood-frame construction under many exterior finishes—masonry veneer, wood siding and shingles, stucco, brick and composition siding. Noncombustible gypsum core adds fire safety not available with plywood or wood-fiber sheathing.

Clad in water-repellent paper on face, back and long edges; ends are coated with special waterproofing compound. Can be stored outside for up to six months in most climates. However, panels are water-resistant, not totally waterproof, and they may require some weather protection or inside storage in wet regions or during extended rainy periods. Must be stored off the ground.

Lightweight and easily handled by one man, Triple-Sealed Sheathing meets the requirements of HUD (FHA) Appendix D for omission of let-in corner bracing when applied to U.S.G. specifications. Tests were witnessed and verified by Pittsburgh Testing Laboratory. Approved for use by all major code bodies—ICBO, BOCA and SBCC.

Triple-Sealed Gypsum Sheathing is 4-ft. wide, 8- or 9-ft. long, and only .40-in. thick.

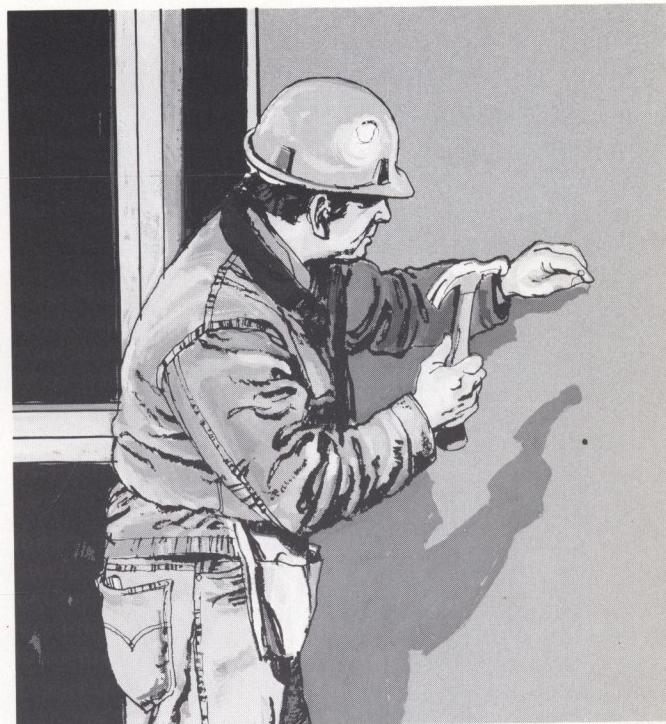
ADVANTAGES

Reduces costs. Triple-Sealed Sheathing is more economical than any structural sheathing on the market. Combining lowest material cost with fastest application, this gypsum product offers lower in-place cost than plywood or wood sheathing.

Repels water, cuts moisture damage. Even though Triple-Sealed Gypsum Sheathing provides all-around water resistance, it also has "breather action" that permits water vapor to escape from stud space—protects framing from moisture buildup.

Resists fire. Offers excellent protection against fire because core is noncombustible gypsum.

Light weight, easy cutting speeds installation.



Provides strength. Tests prove the strength of Triple-Sealed Gypsum Sheathing. Although thinner and lighter in weight, Triple-Sealed Sheathing is flexurally strong with breaking strengths similar to regular 1/2-in. gypsum sheathing (tested per ASTM C473).

Applies easily. Cuts quickly by scoring and snapping. Attaches with a minimum of fasteners. No sawing necessary.

Minimizes waste. Shrinkage, warping and splintering are no problem with Triple-Sealed Gypsum Sheathing. This sheathing cuts so easily that fitting around window frames and doors is simplified—with little waste.

limitations

1. Will not provide a vapor barrier.
2. Maximum stud spacing is 16 in. o.c. when this sheathing is used to provide racking resistance. When not so used or when diagonal corner bracing is used, stud spacing may be 24 in. o.c.

UNITED STATES GYPSUM

USG Triple-Sealed Gypsum Sheathing

ARCHITECTURAL SPECIFICATIONS

notes to architect

These are abbreviated specifications for USG Triple-Sealed Gypsum Sheathing. For additional information and complete specifications, see U.S.G. Architectural Technical Folder SA-927.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of material

All materials shall be delivered in their original unopened packages. Damaged or deteriorated materials shall be removed from the premises.

Part 2: products

2.1 materials

a. USG Triple-Sealed Gypsum Sheathing. 4-ft. wide x .40-in. thick x (8-ft.) (9-ft.) lengths.

b. DURABOND 200 or 300 Drywall Stud Adhesive.

c. 11-ga. galvanized, 1-1/2-in. roofing nails, 7/16-in. head dia. (obtain locally).

Part 3: execution

3.1 gypsum sheathing application

a. Where the sheathing at corners is intended to provide racking resistance, apply a 3/8-in. bead of DURABOND 200 or DURABOND 300 Drywall Stud Adhesive to each stud and plate. Nail sheathing to studs and plates at 12-in. intervals. This method should be used in the application of corner panels only. Stud adhesive may be omitted elsewhere.

b. Where sheathing is not required to provide racking resistance or when diagonal corner bracing is used, nail sheathing to studs and plates at 8-in. intervals. Stud adhesive may be omitted.

c. When required, install 1x4-in. diagonal corner braces at all external corners, let into faces of studs, corner posts, sill and plates. Use two 8d nails at each bearing.

3.2 exterior finish application

a. Wood siding. Drive nails through sheathing and into studs for min. penetration of 1-1/4 in. into studs. Butt end joints of siding over centers of studs.

b. Wood shingles. Apply treated or decay-resistant 3/8x 1-5/8-in. lath strips to gypsum sheathing. Nail lath through sheathing with 8d nails penetrating into studs. Space shingles according to their intended exposure. In double-coursing method, rest butt ends of under-coursing on lath. Nail outer course to lath with small-headed, corrosion-resistant threaded nails. Project butts of outer course 1/2 in. below lath.

c. Composition siding. Install cant strip at foundation line. Nail 1x3-in. wood nailing strips horizontally over sheathing into studs. Apply shingles with 1-3/4-in. color-matched nails. (Also consult manufacturer's recommendations.)

d. Masonry veneer. Provide clear space of at least 1 in. between back of masonry and face of sheathing. Attach masonry ties to wood studs with nails driven through sheathing and into studs. Use nails penetrating at least 1-1/4 in. into studs (at least 6d common nails). Space ties vertically to conform to coursing of masonry veneer. (Consult recommendations of Brick Institute of America for spacing and gauge of masonry anchor clips.)

e. Stucco. Provide clear space of at least 1/4-in. between back of stucco lath and face of sheathing. Apply portland cement-lime basecoat and ORIENTAL Exterior Stucco over lathed sheathing. Use 3.4-lb. self-furring USG Diamond Mesh Metal Lath applied with nails penetrating at least 1-1/8-in. into wood studs.

PRODUCT DATA

Materials: Board with gypsum core; water-repellent paper-encased; waterproofing-coated ends.

Sizes: 8 and 9 ft. long, 4 ft. wide, .40 in. thick.

Edges: Square.

Face finish: Brown paper.

Weights: Approx. lbs./MSF: 1,675.

Compliance with standards: Approved by ICBO, BOCA and SBCC; HUD (FHA) Appendix D.

Packaging: Shipped unbundled in units.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, DURABOND, ORIENTAL.

UNITED STATES GYPSUM

BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606



installation & maintenance / technical data

Description

TEXTONE Gypsum Panels are conventional gypsum panels with factory-applied decorative vinyl facings. The vinyls, available in fabric-backed and unbacked types, offer a wide range of colors and textures.

TEXTONE Panels and Mouldings, together with adhesives, fasteners and other conventional drywall components, are used for predecorated movable partitions, permanent partitions and in remodeling. The tough vinyl covering is wear-resistant and easily cleaned for lasting beauty.

Panels are $\frac{1}{2}$ " thick, 4 ft. wide, and 8, 9 or 10 ft. long with regular core; also may be specially ordered in $\frac{3}{8}$ " and $\frac{5}{8}$ " thickness, 2-ft. widths and custom lengths from 6 to 14 ft. The $\frac{1}{2}$ " and $\frac{5}{8}$ ", 4-ft. wide TEXTONE FIRECODE Panels are available with special core for fire-rated construction.

LIMITATIONS: Use of TEXTONE Gypsum Panels is not recommended: (a) where exposed to extreme or continuous moisture; (b) if frame spacing exceeds 24"; (c) if wood furring is smaller than 2" x 2"; (d) for ceiling application (end joints are difficult to conceal); (e) for application with adhesives other than DURABOND Adhesives since others may not be compatible with the vinyl surface.

Physical Properties of Vinyl

THICKNESS of vinyl is given in mils, averaged over a specific area. One mil is one-thousandth of an inch.

TENSILE STRENGTH, or breaking strength, is listed as minimum. Strength of fabric-backed vinyl is determined in accordance with ASTM D751-68 (Fed. Test Std. No. 191, Method 5100.1). Strength of unbacked vinyl is determined in accordance with ASTM D882-67.

ABRASION RESISTANCE is tested by the Taber Abrader Method (ASTM D1044-56) or (Fed. Test Std. No. 191, Method 5306.1). Fabric-backed vinyls are also tested by the Wyzenbeek Method (Fed. Test Std. No. 191, Method 5304.1).

DIMENSIONAL STABILITY is the ability of a plastic film or sheet to retain the precise shape to which it was calendered, extruded or cast. Test consists of exposing a 10"x10" piece of vinyl to heat, the amount depending on the properties of the vinyl. The amount of shrinkage after vinyl is conditioned at room temperature gives the percent of dimensional stability.

PLIABILITY indicates flexibility of sheeting or film; also the character of softness and hardness.

GRAIN RETENTION shows ability of films and sheetings to retain their embossing after lamination. The laminating process is normally a combination of heat and pressure. The test procedure is to hold the temperature at 250°F for four minutes with the vinyl sheet lying on a metal plate. The specimen is viewed after this test to determine its acceptability.

COLOR MATCH — Vinyl for TEXTONE Panels is subject to minor variations in color. This condition is common to the vinyl industry and most architects and designers are aware of it. Vinyls are supplied in what is known as "commercial color match" that allows for minor variations. In cases where color match is critical, a sample of material to be matched must be submitted with the order. Also, when constructing walls that will be seen simultaneously in the same area, use material with the same lot numbers, plainly marked on back of TEXTONE Panels. When installing Textile and Woodgrain patterns, place panels against wall, inverting alternate panels, and rearrange to obtain the best match in pattern and tone; there will be a slight variation from panel to panel. Number backs of panels for proper installation sequence.

Establishing a commercial color tolerance variation is a matter of judgment and must take into account many variables, including light source, light reflection, embossing, luster, individual ability to accurately discern true color, and other factors.

PAINTABILITY — The following products are recommended for painting TEXTONE Gypsum Panels; USG Satin-Lustre Enamel; PRO-KYD Flat Wall Paint; GRAND PRIZE Latex Semi-Gloss Enamel; GRAND PRIZE Latex Wall Paint; GRAND PRIZE Interior Latex Eggshell Finish.

Federal Specifications

The current Federal Specification for vinyl-coated wall coverings is CCC-W-408-A with Type I (Light Duty), Type II (Medium Duty), and Type III (Heavy Duty).

Type I — lightweight vinyl fabric, weighing from 7 to 12 oz./sq. yd. Usually produced on a cotton sheeting which weighs from 1 $\frac{1}{2}$ to 3 oz./sq. yd.

Type II — medium-weight vinyl fabric weighing between 15 and 20 oz./sq. yd. Backing usually consists of either Osnaburg or Drill fabric for structural strength, with weight between 3 and 5 oz./sq. yd.

Type III — heavyweight vinyl fabric in excess of 22 oz./sq. yd. Produced on Broken Twill fabric backing, weighing between 7 and 9 oz./sq. yd.

The Textile pattern vinyl coverings of TEXTONE Panels comply with Type I of Federal Specification CCC-W-408-A. Since this specification applies only to fabric-backed wall coverings, it is not applicable to the vinyls used on other TEXTONE Panels.

Panels meet Fed. Spec. SS-L-30d, Type III, Class 3; the base gypsum panels meet ASTM C36-67.

Storage

TEXTONE Panels should be stored indoors or protected from the weather, stacked flat in their original packages until needed.

Directions—Nail-On Application

Apply panels vertically. Position less-than-full-width panels with cut edge at corner. Use USG Color-Matched Nails wherever nails are exposed. Drive nails with plastic-headed hammer, rawhide mallet, or carpenter's hammer with pliable leather over head. Space 1 $\frac{1}{8}$ " nails 8" apart and at least $\frac{3}{8}$ " from ends and edges.

Directions—Adhesive Application

Where exposed fasteners are objectionable, install TEXTONE Panels using DURABOND Vinyl Foam Tape and a DURABOND Adhesive.

DURABOND Tape is a high-strength vinyl foam, double-faced tape with pressure-sensitive adhesive. It is designed only as a temporary means of attaching panels until the DURABOND Adhesive attains ultimate strength.

This DURABOND Tape/Adhesive System is recommended for application of TEXTONE Panels to wood or steel framing, or to suitable existing wall surfaces. In nonfire-rated wall assemblies, DURABOND Tape and Adhesive also may be used to laminate double-layer gypsum panel facings. DURABOND Taping Compounds and mechanical fasteners are required for laminating panels in fire-rated assemblies.

Bond Test: To determine whether condition of existing surfaces will permit adequate bond, apply an 8" length of tape to the sub-

strate. Next, using normal pressure, apply to tape a square-foot section of the specific panel to be used. After 24 hrs. remove panel. If back paper of TEXTONE Panel tears during removal, substrate surface condition is satisfactory for adhesive bond. The same test should be conducted with the permanent adhesive.

TEXTONE Panels applied vertically to a continuous surface — Use DURABOND 500 Adhesive and DURABOND Vinyl Foam Tape to laminate TEXTONE Panels to gypsum backing board, sealed plaster, painted surfaces, monolithic concrete, concrete block, gypsum partition tile (sized).

Use DURABOND 500 Adhesive and temporary mechanical fasteners for laminating panels to such surfaces as wood- and mineral-fiber sound deadening board; DURABOND 500 Adhesive and temporary mechanical fasteners with polystyrene or urethane rigid foam insulation.

Use DURABOND 600 Adhesive to laminate TEXTONE Panels to gypsum panels in double-layer systems.

Apply three strips of DURABOND Vinyl Foam Tape across back of panel, one at middle and one strip $\frac{3}{8}$ " from each end. (Mechanical fasteners may be substituted for strips of tape at ends of panels.) In double-layer gypsum panel systems, where the base layer consists of horizontally applied tapered-edge board, position tape to avoid the tapered depression at joints. Leave protective paper on tape until ready to install panel. Use a metal spreader with four $\frac{1}{4}$ " x $\frac{1}{4}$ " notches spaced 2" o.c. max. to spread DURABOND 500 Adhesive uniformly over entire back of panel between tape. Keep adhesive 2" away from tape to prevent interference with bonding of tape. Remove protective paper from tape, place panel vertically in its final position, and press into firm contact with existing substrate. Apply firm pressure over entire length of tape.

In double-layer systems with Regular SHEETROCK Panels as base layer, pre-cut and fit panels and apply DURABOND 600 Adhesive with short-nap paint roller to cover contact surfaces of both base and face-layer panels. Let adhesive air-dry to touch — about 30 min., depending on temperature and humidity. Color will turn from light blue to a darker blue. Apply panels as soon as possible after drying occurs and space fasteners 16" o.c. at top and bottom of panel.

TEXTONE Panels applied to wood or steel studs — Use either DURABOND 200, 300, or Multi-Purpose Adhesive for wood framing; DURABOND 200 or Multi-Purpose for steel framing. Apply 8" long strips of DURABOND Vinyl Foam Tape, with protective paper in place, to face of each stud as temporary fasteners to secure panels. Position strips at midpoints of studs for panels up to 8 ft. long; at third-points for panels from 8 to 12 ft.; at quarter-points for panels longer than 12 ft. Apply a continuous $\frac{3}{8}$ " bead of DURABOND Adhesive to face of studs and to within 6" of their ends. Where two TEXTONE Panels meet on a stud, apply two continuous $\frac{3}{8}$ " beads, one bead at each edge of stud face. Keep adhesive 2" away from tape.

Remove protective paper from tape, place panel vertically and press into firm contact with framing members. Fasten top and bottom of panel with screws or nails spaced 6" o.c. and $\frac{3}{8}$ " from panel ends. (In lieu of fasteners at panel ends, apply an 8" long strip of tape at top and bottom of each stud.) Apply firm pressure along each stud, particularly over the tape area.

Precautions — Keep adhesive from contact with vinyl surface. Remove excessive adhesive immediately as damage can occur within 15 min. For DURABOND 300, 500 or 600 Adhesive, wash with warm water and detergent before adhesive dries. Rinse with clean water and wipe dry. For DURABOND 200 or Multi-Purpose, use mineral spirits.

Cut TEXTONE Panels with a sharp trim-knife. For straight cuts, cut through vinyl film into core using a straightedge. Snap board and cut back-paper. For irregular cuts, cut vinyl with knife and cut core with keyhole saw. Caution: Holes made with special outlet cutters should be cut from backside of panel to avoid delamination of vinyl around cut. For installation of USG Demountable Partitions, see WB-1264 Directory of Components, and WB-1288 Installation Manual.

Maintenance

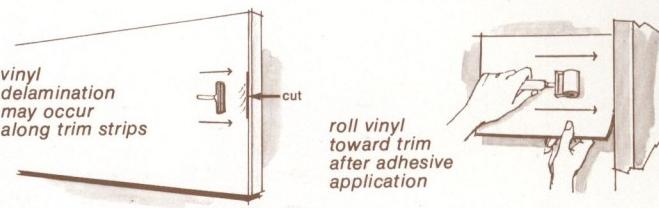
Repairs — Blisters and wrinkles in the vinyl surface usually result from structural movement causing tension between vinyl and adjacent steel components or abutting panels. The vinyl becomes stretched and delaminated from the gypsum board near a joint or edge trim.

To repair, cut the vinyl with a sharp knife along metal trim or in an unobtrusive place in the "V" joint between panels. Extend cut 2" in both directions beyond damaged area.

Direct a heat gun (such as Model HG 7518 of Master Appliance Corp., Racine, Wisc.) uniformly over surface of damaged area from a distance of about 10". Continue to heat until vinyl becomes flexible, but not to the point that it is uncomfortable to touch. Direct heat gun under edge of vinyl and carefully pull vinyl away from board with a 4" broadknife. Release vinyl slightly beyond the damage in all directions.

Apply DURABOND Vinyl Wallcovering Adhesive sparingly to underside of vinyl while it is still flexible. Coat vinyl completely, but do not leave excess adhesive that will squeeze out at the edge. With a 6" rubber roller, roll vinyl toward the cut. Remove excess adhesive that squeezes out.

Use a broadknife or seam roller over a sheet of light cardboard to complete the contact and to fit at joints. The cardboard will protect vinyl surface from damage and appearance change. If necessary, reapply heat to roll out remaining wrinkles.



Before adhesive has dried on surface of vinyl, wash with a sponge and non-sudsing detergent and water. It may be necessary to use a nylon-bristle brush to remove adhesive that has dried in the embossed pattern. Isopropyl (rubbing) alcohol may also be used to remove some adhesives.

Cleaning — Most stains can be removed with a neutral soap or detergent, warm water and, if necessary, a nylon-bristle brush. Rinse with clean water and wipe dry.

Cleaning solvents such as gasoline, kerosene, naphtha, carbon tetrachloride, lighter fluid, etc., should be avoided, as they may damage the vinyl and their vapors are extremely dangerous. The use of abrasive cleaners is not recommended, as they may remove the printed design and leave a dull, uneven appearance.

Stains from tar, asphalt, ball-point ink, lipstick, dye, hair colorant, shoe polish, mustard and catsup are difficult to remove because they "migrate" into the vinyl. They should be cleaned at once to retard this action. Exposure of the stained area to sunlight may make it less noticeable after a period of time.

Tar, asphalt: Remove at once. Using cloth dampened with kerosene, rub gently from outside edge of stain to center. Rinse.

Chewing gum, grease, crayon, shoe polish: Scrape off as much as possible (gum can be removed more easily if first rubbed with ice) and go over lightly with cleaning fluid to remove remainder. If shoe polish has been left for any length of time, permanent staining may occur.

Ball-point ink: Remove immediately with cloth dampened in alcohol. Rinse thoroughly.

Oil-base paint: Remove immediately with sponge or cloth dampened with turpentine or kerosene. Rinse thoroughly.

Water-soluble paint: Remove at once with detergent and warm water, using nylon-bristle brush if necessary. Rinse.

Nail polish, lacquer: Immediately pick up as much as possible with dry cloth without spreading. Go over quickly and lightly with non-flammable cleaning fluid. Rinse.

Notice: The following trademarks used herein are owned by United States Gypsum Company: TEXTONE, SHEETROCK, DURABOND, FIRECODE, USG, GRAND PRIZE, PRO-KYD.

UNITED STATES GYPSUM

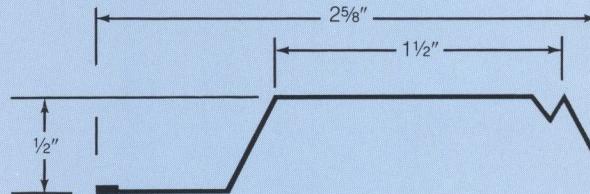
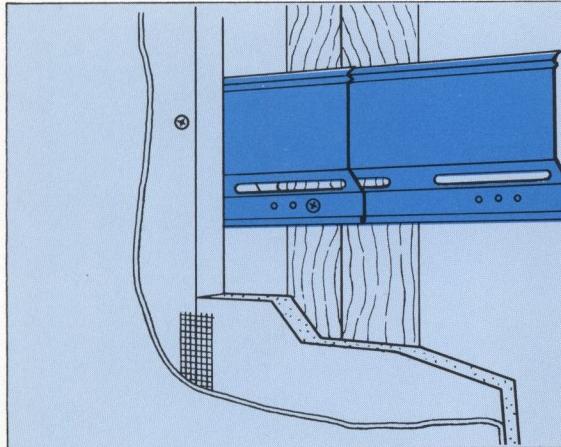
BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

RC-1 SHEETROCK Resilient Channels

low-cost sound attenuation for
party walls and ceilings

4



description

RC-1 SHEETROCK Resilient Channel, for furred attachment of partition/ceiling surfaces, is one of the most efficient, low-cost methods available to reduce transmission of airborne sound through wood-frame assemblies. Works equally well with gypsum drywall and veneer plaster interiors.

Simple in concept, this patented channel is uniquely designed to take advantage of the "decoupling" principle of sound attenuation, with a spring-like flange for attachment of gypsum panels or plaster base. The spring-action provides a buffer of resiliency that effectively damps sound waves striking the surface, dissipating the energy internally and reducing transmission through the framing.

These roll-formed, 25-ga. galvanized steel channels are most effective when used in combination with THERMAFIBER Insulating Blankets to maximize absorption of sound energy, although they offer substantial sound attenuation without them. The channel is screw-attached, through pre-punched holes in its inner flange to studs or joists, then gypsum board is mounted by means of screws through the knurled outer face of the channel. Channels are mounted horizontally at 24" intervals over framing spaced at 16" o.c. This resilient attachment is fully effective used on only one side of framing; conventional direct attachment of board may be used on the other.

advantages

Greatest sound control efficiency. RC-1 SHEETROCK Resilient Channel systems provide more sound attenuation, dollar-for-dollar, than conventional assemblies. One typical RC-1 partition rates, at STC 52, 7 points higher than either of two commonly used conventional sound control partitions, at lower cost-in-place—9% less than one employing double-layer gypsum sound deadening board, 16% less than one with staggered studs on a single plate. Needed on only one side of single-row studs, with single-layer facings, these channels permit a partition that is both lighter (7 psf) and thinner (5 1/4"). With the same RC-1 Channels used for ceiling attachment, plus THERMAFIBER Insulating Blankets in the cavity, a conventional 2x10 wood joist/1 1/4" nom. wood sub-and-finish floor assembly yields STC 51, and an excellent IIC 46, boosted to a superior STC 52, IIC 71 with 44/40-oz. carpet/pad (based upon laboratory test comparisons). Construction is conventional, and the only additional component used is the inexpensive RC-1 Channel.

Fast-erecting, adaptable. The same RC-1 Channel system is used for both partitions and floor/ceilings, all other components conventional. The channels are quickly installed with self-drilling USG® Brand Screws through pre-punched holes. They also can be used in area separation walls, with fire ratings up to 3 hrs.

Performance minimizes callbacks. As a bonus, the RC-1 Channel system offers other benefits not found in conventional methods. The screw-attached resilient channel minimizes ridging, fastener "pops", and resultant callbacks, because it helps absorb structural stresses.

Exceeds code requirements. The RC-1 Resilient Channel system meets and exceeds minimum standards of HUD/FHA for control of sound transmission, and is approved by all model codes. Approval by local building inspectors is easy because there is only one system to check for walls and ceilings.

limitations

1. Maximum frame spacing for resilient channels: ceiling—24" o.c. for joists at 16" o.c.; 16" o.c. for joists at 24" o.c.; sidewalls—24" o.c.
2. USG Brand Type S Screws must be used for attaching gypsum panels to RC-1 Resilient Channels.
3. RC-1 Resilient Channels must be screw-attached to joists with 1 1/4" Type W or 1" Type S Screws; nails must not be used. For fire-rated construction, use 1 1/4" Screws, Type S or W.
4. Resilient ceilings should not be installed beneath highly flexible floor joists, only to framing meeting "Wood Framing Requirements" shown in U.S.G. Gypsum Panels & Accessories Folder SA-927.
5. Direct attachment to wood framing with fastener penetration into wood exceeding 1" is not recommended except where required to meet fire rating.
6. Not recommended for exterior soffits and ceilings which project upwards and away from the building proper.
7. Not recommended for wall tile base panel attachment. Direct attachment (and SHEETROCK W/R Panels in baths or other high-moisture areas) should be used.

UNITED STATES GYPSUM

RC-1 SHEETROCK Resilient Channels

ARCHITECTURAL SPECIFICATIONS

notes to architect

1. USG Acoustical Sealant is recommended to seal all cut-outs, such as electrical boxes, and at the perimeter of sound control partitions. Door and borrowed-light openings are not recommended. Flanking paths and back-to-back penetrations of the diaphragm should be eliminated. Exterior wall surfaces should be resiliently mounted to minimize flanking paths between floor and ceiling construction.

2. These specifications are abbreviated, for additional information see U.S.G. Architectural Technical Folders SA-913, 924, 925 & 927.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. Gypsum Panels (max. practical lengths to minimize joints): (SHEETROCK (Regular) (W/R) (FIRECODE "C") (Foil-Back) Gypsum Panels, (1/2") (5/8") thick x 4' wide.) (TEXTONE Vinyl Panels) (type) (color or pattern).

b. Corner Reinforcement: (DUR-A-BEAD No. 101, 103, 104)(No. 800).

c. Metal Trim: USG Metal Trim No. (200-A 1/2" or 5/8") (200-B 1/2" or 5/8") (200-C) (400, 401 or 402) (801-A 1/2" or 5/8") (801-B 1/2" or 5/8").

d. Plastic Trim: USG (P-1) (P-2) (RP Series), Vinyl Trim.

e. Resilient Channels: RC-1 SHEETROCK Resilient Channel.

f. Drywall Screws: (length) USG Brand Screw Type (S) (W).

g. Drywall Nails: (length) (type) (USG Matching Color Nails to match finish of TEXTONE Vinyl Panels) (conforming with "Recommended Performance Standards for Nails for Gypsum Wallboard", adopted by the Gypsum Association and the Gypsum Drywall Contractors International) (as specified in fire-resistive construction).

h. Control Joints: USG Control Joint No. 093.

i. Joint Treatment: (specify from U.S.G. folder SA-927).

j. Caulking: USG Acoustical Sealant.

Part 3: execution

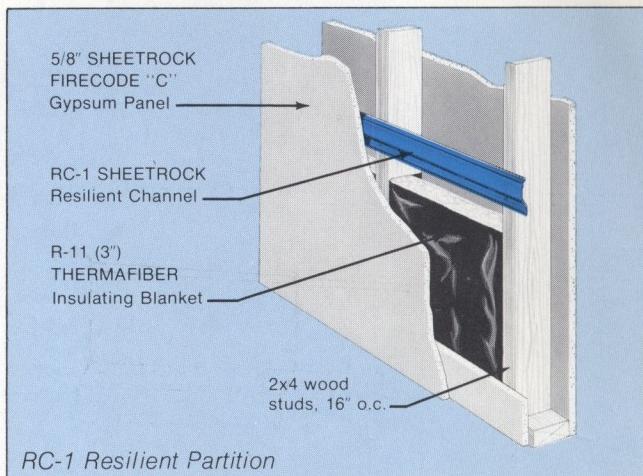
3.1 resilient channel erection

Position resilient channels at right angles to wood framing, space (16") (24") o.c. and attach to supports with USG Brand 1 1/4" type W, 1 1/4" type S or 1" type S screws driven through holes in channel mounting flange with an electric screwdriver.

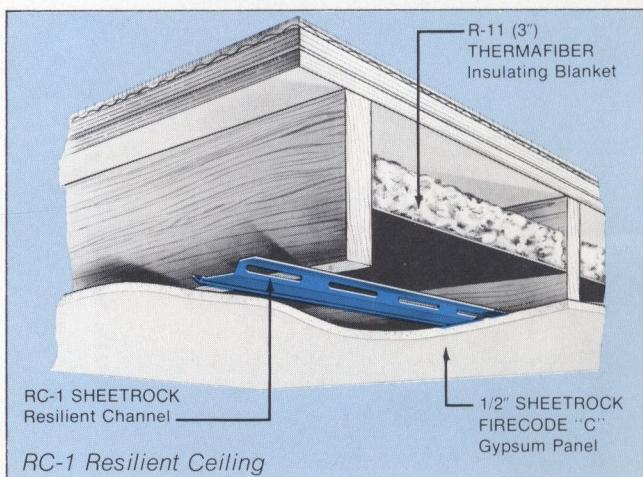
On walls, attach 1/2" x 3" wide continuous filler strips to bottom plate. Install channels with mounting flange down, top channel max. 6" down from ceiling, bottom channel 24" up from floor. Extend channels into all corners and attach to corner framing. Position channels max. 6" from wall-ceiling angle. Cantilever channel ends no more than 6". For double layer system, attach channel through base layer to framing with 1 1/8" type S screws.

To splice channel, nest over framing member and screw-attach through both. Reinforce with screws at both ends of splice.

To install cabinets attach RC-1 Channels to studs at center of top and bottom cabinet hanger brackets. If distance exceeds 24" between hangers, install additional channel midway.



RC-1 Resilient Partition



RC-1 Resilient Ceiling

3.2 gypsum panel application

(See specifications in U.S.G. Folder SA-927.)

3.3 control joint installation

Attach USG Control Joint No. 093 with Bostitch 9/16" "G" staples or equal, spaced not over 6" apart in each flange. Cut end joints square and align. Remove protective tape after joint treatment.

PRODUCT DATA

Material: 25-ga. galvanized steel

Weight: 215 lb./MLF

Length: 12 ft.; **Width:** 2 3/4 in.; **Furring depth:** 1/2 in.

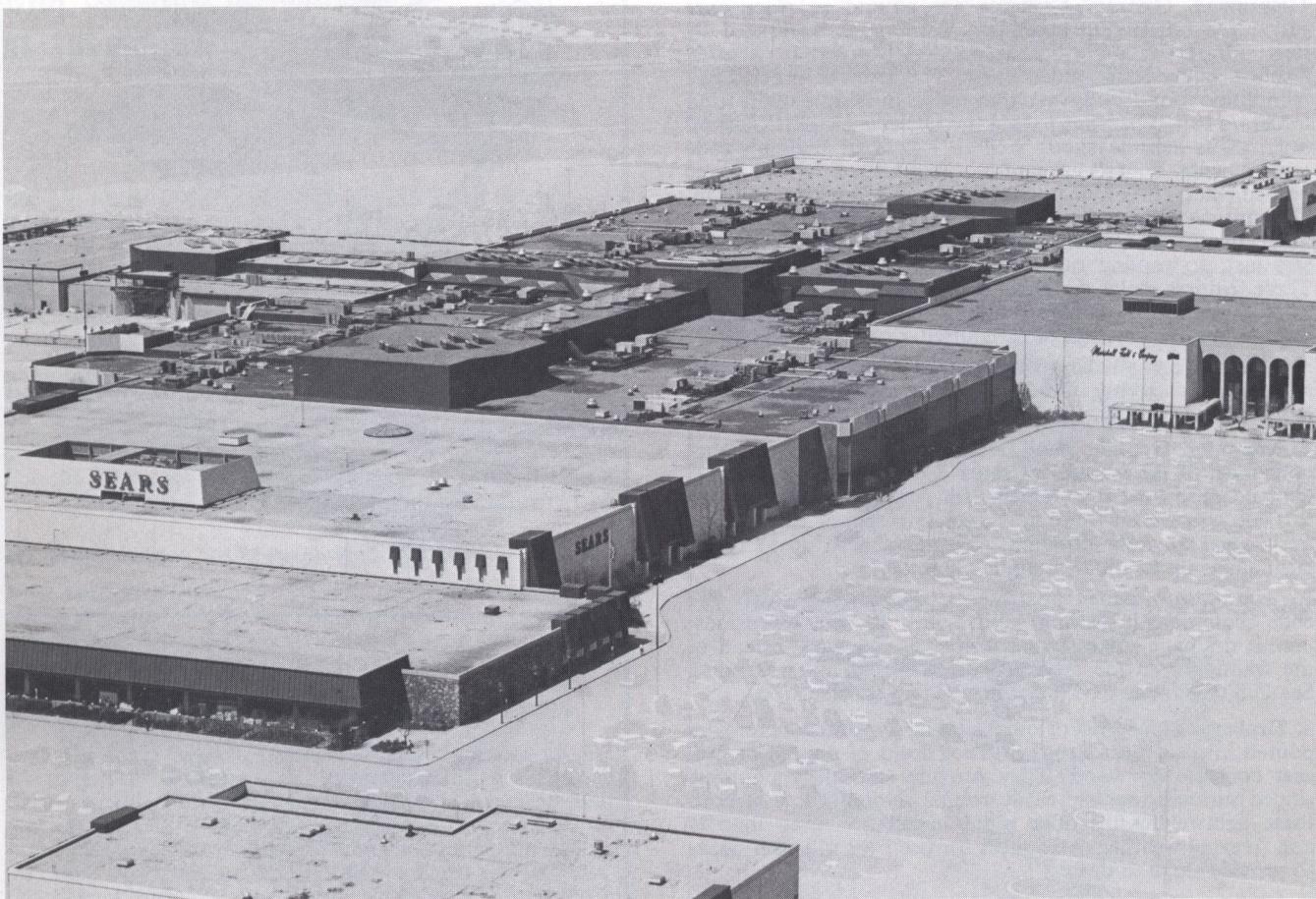
Packaging: Bundles of 20 pcs.—240 lin. ft.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, THERMAFIBER, FIRECODE, TEXTONE, DUR-A-BEAD.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM
BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606



new ways to meet changing requirements in energy conservation, government regulations, construction costs

Many owners, developers, specifiers and contractors have found that gypsum concrete roof decks help beat the performance-cost squeeze. These systems offer high-quality roof decks—at competitive prices—ideal for schools, shopping centers, industrial plants and other institutional and commercial buildings. Check these important benefits found in gypsum concrete roof decks:

- **energy cost savings**
- **low-cost noise control**
- **improved fire protection**
- **lower insurance rates**
- **reduced construction costs**
- **high structural strength**
- **design versatility**
- **all-weather installation**

With these benefits, it's no wonder more gypsum decks are being installed than ever before—they offer *more value* than any other major deck system.

wider choice

U.S.G. offers 5 roof deck systems

1. Fire-rated Gypsum Roof Decks of PYROFILL and THERMOFILL Gypsum Concrete are poured in place over galvanized reinforcing mesh and formboards supported by steel sub-purlins. Formboards are left exposed or a rated finished ceiling is suspended below. The result is a rock-hard, monolithic roof deck system that resists hurricane uplift wind forces up to 125 psf; has passed the UL Wind Uplift Class 90 test; resists seismic shock well in excess of building code requirements. Poured gypsum concrete takes any roof shape needed—flat, curved or pitched—to match function to form. Gypsum decks are rated noncombustible and their use dramatically reduces insurance rates for lifetime savings. Gypsum sets fast, so roofing can be applied without undue delay. These features make the systems ideal for schools, hospitals, warehouses, industrial construction and other buildings where up to 2-hour fire resistance is required.

THERMOFILL has all the advantages of PYROFILL plus perlite aggregate that gives poured roof decks higher thermal insulation values with light weight.

2. Non-rated Gypsum Roof Decks are poured systems that offer most of the features of rated decks. They meet normal live and dead load requirements for roof purlin spacings up to 11 ft. where roof framing is steel, concrete or wood. With prestressed concrete structural elements spaced up to 16 ft., clear spans up to 100 ft. may be obtained.

In wood-frame garden apartments, these decks satisfy fire code requirements without above-deck firewall extensions; permit drainage slopes to be formed in the slab instead of the framing; provide an excellent barrier to outside noise. See U.S.G. Folder IR-538 for details and specifications.

3. Drainage Slope Fills of quick-setting gypsum concrete are poured in place over structural roof decks of poured or pre-cast concrete or wood. They provide smooth, monolithic sloped surfaces that are easily roofed. Notably low in cost, these lightweight fills offer rapid installation even in cold and freezing weather. Also ideal for use over old roof decks to provide slope to drains.

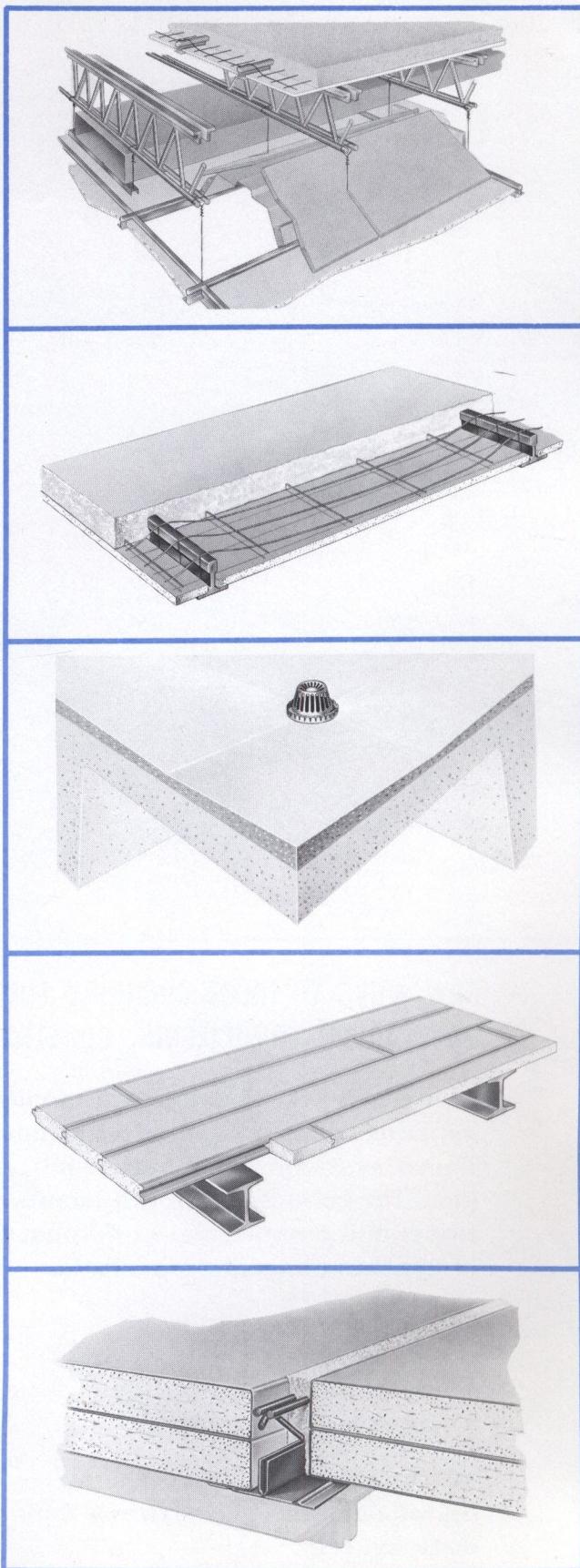
4. USG Metal Edge Gypsum Plank, with a specially developed water-resistant core, is precast at the factory for installation in any weather on flat or steeply pitched roofs. This structural unit 2" thick, 15" wide and 10 ft. long, weighs approximately 13 psf and is reinforced with galvanized T&G edges and 16-ga. wire mat. Planks are quickly laid over steel, concrete or wood joists to form a noncombustible, structurally reinforced roof deck ready for roofing. For details, refer to U.S.G. System Folder SA-306 on Metal Edge Gypsum Plank.

5. USG Laminated Gypsum Roof Planks offer simple-to-install, low-cost, dry deck systems ideal for use over conventional bar joists or purlins on smaller projects. These units combine with steel framing to reduce deck weight 30% to 50% under other dry systems. They provide efficient, noncombustible assemblies that meet most live load requirements on spans up to 8 ft. The factory-laminated gypsum board planks, 2" thick, 2 ft. wide, and 8 or 10 ft. long, weigh 8.4 psf and are supported by regular roof deck sub-purlins or H-channels. For details, refer to U.S.G. Folder IR-564.

limitations

1. Gypsum roof decks are suitable for normal temperature and humidity conditions. Acid fumes, generally not harmful to gypsum, may affect framing. Where such abnormal conditions prevail, consult U.S.G. for recommendations.

2. Certain recommendations concerning drying and ventilation, expansion and contraction, decorating and roofing must be adhered to for satisfactory performance (see Specifications, page 14 for details).

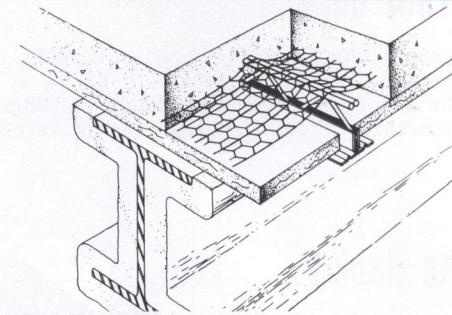


**a choice of 2-hour fire-rated systems
with exposed formboard
or suspended acoustical ceilings**

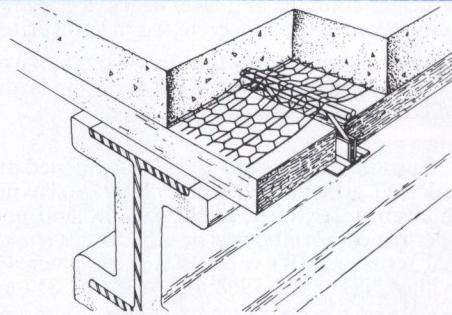
The UL-tested U.S.G. roof deck systems listed below assure the extra protection required in a specific application. U.S.G.'s policy of comprehensive testing of complete roof systems offers high-quality decks that meet all major building codes. Fire-rated gypsum decks also qualify for lower rates on insurance than insulated steel decks. Premium savings to owners can amount to as much as 55% annually.

UL Design No. P676 (was RC-23—2 Hr.)

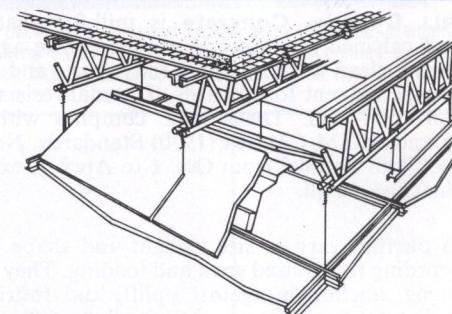
2-in. PYROFILL Poured Gypsum Concrete and KEYDECK reinforcing mesh on $\frac{1}{2}$ -in. exposed SHEETROCK or 1-in. FIRECODE Formboard supported by KEYDECK truss tees spaced $32\frac{3}{4}$ in. o.c. on fireproofed beams 8 ft. o.c. max. Slab weight: 11 psf.



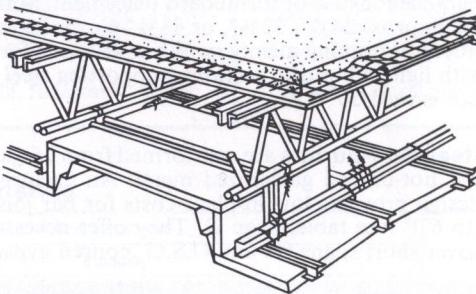
UL Design No. P676



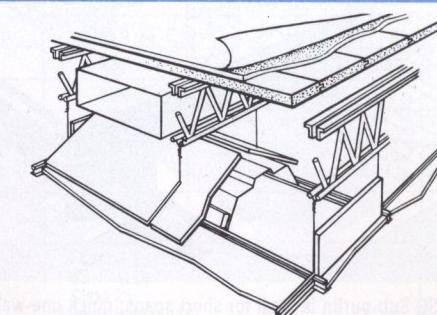
UL Design No. P677



UL Design No. P207



UL Design No. P002



UL Design No. P213

UL Design No. P207 (was RC-6—2 Hr.)

2-in. PYROFILL Poured Gypsum Concrete reinforced with KEYDECK wire mesh on $\frac{1}{2}$ -in. SHEETROCK or 1-in. FIRECODE Formboard supported by KEYDECK bulb tees spaced 32 in. o.c. and welded to 12-in. steel bar joist 4 ft. o.c. max. and AURATONE FIRECODE or AIRSON AURATONE FIRECODE Acoustical Panels suspended on an exposed rated grid system. Rating also applies when $\frac{1}{2}$ " SHEETROCK Formboard supported by USG Sub-purlin 16, 18 or 20 are substituted. Slab weight: 11 psf.

UL Design No. P002 (was RC-13—2 Hr.)

2-in. THERMOFILL Poured Gypsum Concrete and KEYDECK reinforcing mesh on $\frac{1}{2}$ -in. SHEETROCK or 1-in. FIRECODE Formboard supported by KEYDECK bulb tees spaced $32\frac{3}{8}$ in. o.c. and welded to 10-in. steel bar joist spaced 4 ft. o.c. max. and AURATONE FIRECODE or AIRSON AURATONE FIRECODE Acoustical Tile suspended on a standard concealed Z-spline system. Rating also applies when $\frac{1}{2}$ " SHEETROCK Formboard supported by USG Sub-purlin 16, 18 or 20 are substituted. Slab weight: 8.2 psf.

UL Design No. P213 (was RC-22—2 Hr.)

USG Metal Edge Gypsum Plank clipped or welded to bar joists spaced up to 7 ft. o.c., $\frac{3}{4}$ -in. noncombustible roof insulation, light fixtures and air dampers, AURATONE FIRECODE Ceiling Panels on an exposed rated grid system. Plank weight: 13 psf.

UL Design No. P501

USG Metal Edge Gypsum Plank clipped or welded to bar joists spaced up to 4 ft. o.c., $\frac{3}{4}$ -in. noncombustible roof insulation, USG Metal Furring Channels 24 in. o.c. wire-tied to joists, $\frac{5}{8}$ -in. SHEETROCK FIRECODE "C" Gypsum Panels screw-attached to channels, joints unfinished or taped. Plank weight: 13 psf.

design versatility

in the roof deck . . .

U.S.G. gypsum concrete can be shaped to virtually any roof configuration—curves, pitches, sawtooth angles or flat. It provides the adaptability needed to design buildings of distinctive appearance with no sacrifice of construction efficiency.

over the deck . . .

Gypsum concrete simplifies building design and permits use of constant height columns and level decks. Slopes for drainage are readily screeded over concrete, wood or insulated decks.

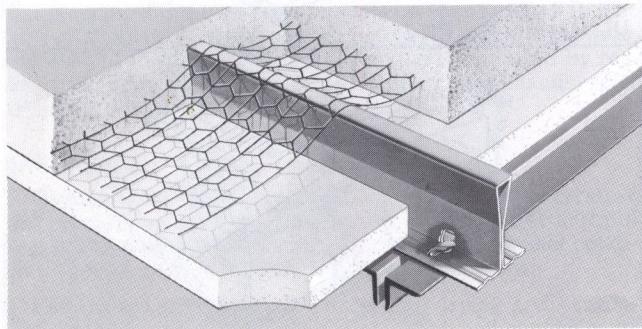
A certification program assures that PYROFILL or THERMOFILL Gypsum Concrete meets or exceeds industry standards for dry density and compressive strength (see page 15).

PYROFILL Gypsum Concrete is mill-formulated and composed of calcined gypsum and wood chips or shavings. It is mixed with clean water, only, at the job site and poured-in-place over permanent formboards or other decks as a drainage fill. Thermal resistance (R) value is 0.67 per inch. PYROFILL complies with ANSI A59.1-1968 and ASTM C317-64 (1970) Standards.

THERMOFILL Gypsum Concrete is mill-formulated and composed of calcined gypsum and graded perlite aggregate. It is mixed with clean water, only, at the job site and poured-in-place over permanent formboards. Thermal resistance (R) value is 0.87 per inch. THERMOFILL complies with ANSI A59.1-1968 and ASTM C317-64 (1970) Standards. Not available north of 40th Parallel from Oct. 1 to April 1, except for use as drainage slope fill.

Steel sub-purlins vary in size, weight and shape and are selected according to required span and loading. They provide lateral bracing, anchorage against uplift, and restrict deck movement due to temperature change. Sub-purlin spacing accommodates 24", 32", or 48" formboard widths with a slight tolerance for ease of formboard placement. Sub-purlins are spaced approx. 24 $\frac{1}{8}$ ", 32 $\frac{1}{8}$ ", or 48 $\frac{1}{8}$ " o.c. and are welded to the structural framing members. When 48" wide formboard is used with light sub-purlin sections, supporting steel spacing should not exceed 36" o.c.

USG Steel Sub-purlins are roll-formed from 16-ga., 18-ga. and 20-ga. hot-dipped galvanized metal. An exclusive light-weight design provides low in-place costs for bar joists spacings up to 6'0" (see table, page 9). They offer necessary roof support over short spans for any U.S.G. poured gypsum con-



Cost-saving USG Sub-purlin is ideal for short spans; quick one-weld installation resists uplift.

crete roof deck. Assemblies using USG Sub-purlins qualify for 2-hour UL fire rating (UL Designs P207 and P002).

USG Sub-purlins anchor the slab against uplift forces and supply strong lateral bracing. Galvanized finish requires no painting. Quick one-weld installation eliminates usual double welds at sub-purlin ends and affords uplift resistance up to 500 lbs. with $\frac{3}{8}$ " weld through web and flanges to framing.

Other sub-purlins, neither manufactured nor sold by U.S.G., are available for heavier loads and longer spans (see page 9).

Reinforcing mesh for PYROFILL is one of following types:

1. **KEYDECK**—A galvanized wire mesh, woven with 16-ga. straight wires and 19-ga. diagonal wires.
2. **48-1214**—A galvanized, welded wire mesh with 12-ga. longitudinal wires at 4" o.c. and 14-ga. transverse wires at 8" o.c.

The effective cross-sectional area of reinforcing mesh placed at 90° to the sub-purlins is .026 sq. in. per foot of mesh width. U.S.G. neither manufactures nor sells reinforcing mesh.

in the formboards . . . concealed or exposed

Four U.S.G. Formboards offer complete freedom of design. They are used singly or in combination to provide insulation, fire protection, moisture resistance, pleasing appearance, economy of installation, or sound control. They serve both as a formboard for the poured gypsum concrete and, when needed, as semi-finished ceilings eliminating costs of additional ceiling material. Their superior fire protection makes added fireproofing materials unnecessary and often reduces insurance costs.

SHEETROCK Formboard is a rigid gypsum board, treated to resist mildew effectively where adequate ventilation is provided. Two-hour fire ratings and 46 STC are available with 2" gypsum slabs and exposed tees. Ideal for almost every roof deck need, concealed or exposed. Makes economical ceilings for warehouses, light manufacturing buildings, schools—any construction where durability and low cost are desired.

FIRECODE Formboard is a rigid, highly insulative board suitable for 2-hour fire-rated construction. The mineral fibers will not contribute to mildew growth. Reduces reflected noise—provides performance up to 50 NRC (see table at right). Available in two types:

Custom has a white factory-applied finish; used for high ceilings that require a semi-finished surface with built-in acoustical properties and good light reflectance.

Economy has a natural matte surface with a medium tan color. Ideal for concealed areas where a ceiling will be suspended below the deck or where ceiling appearance is not an important factor.

Asbestos Cement Formboard is a rigid, industrial type board that provides more resistance to heat and humidity than other formboards. Ideal for use on exterior soffits and above heat-producing machinery where temperatures at the board are less than 125° F.

noise control

built-in acoustical performance to help meet OSHA standards

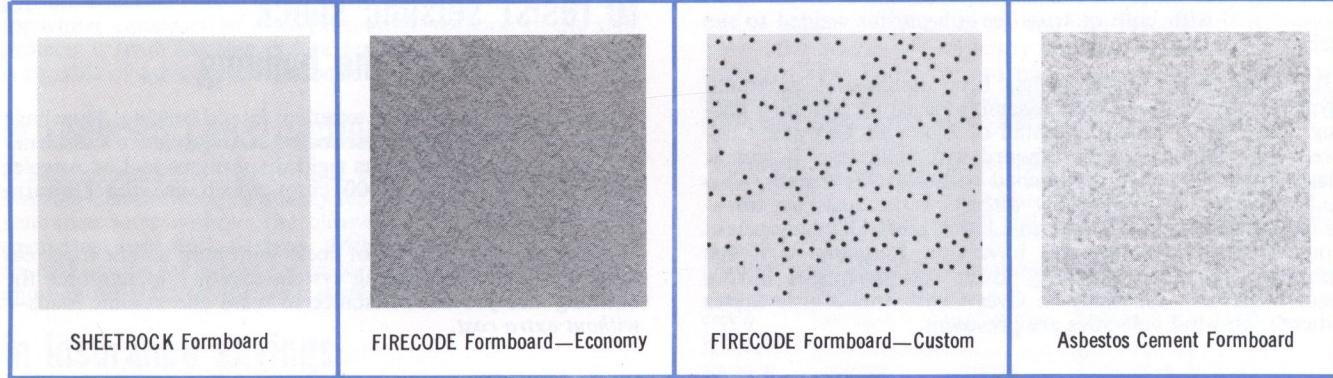
As a result of the Occupational Safety and Health Act of 1970, plant management is faced with the choice of maintaining noise levels within specified ranges, or limiting the duration of employees' exposure to high noise levels. Since reduced exposure has the effect of increasing production costs, every effort should be made in new plant design to limit noise levels.

Another regulation requires all plants with Federal contracts over \$10,000 to eliminate continuous noise over 90 dbA where workers are present.

U.S.G. roof deck systems with gypsum concrete poured over exposed glass-fiber formboard offer the most economical method of incorporating a large sound-absorbent surface in new plant construction. The glass-fiber formboards effectively absorb sound and reduce reverberation. Interior noise levels can be reduced up to 7 db with these formboards, which offer .75 to .95 NRC. Glass-fiber formboards are not manufactured by U.S.G.

Exterior noise is efficiently attenuated by the high sound transmission loss of the gypsum deck. PYROFILL Gypsum Concrete, poured 2½" thick over SHEETROCK Formboard, developed STC 46, three points higher than the best-rated steel deck system, as tested by Riverbank Acoustical Laboratories. See U.S.G. brochure IR-548 for complete design data on noise control with U.S.G. roof deck systems.

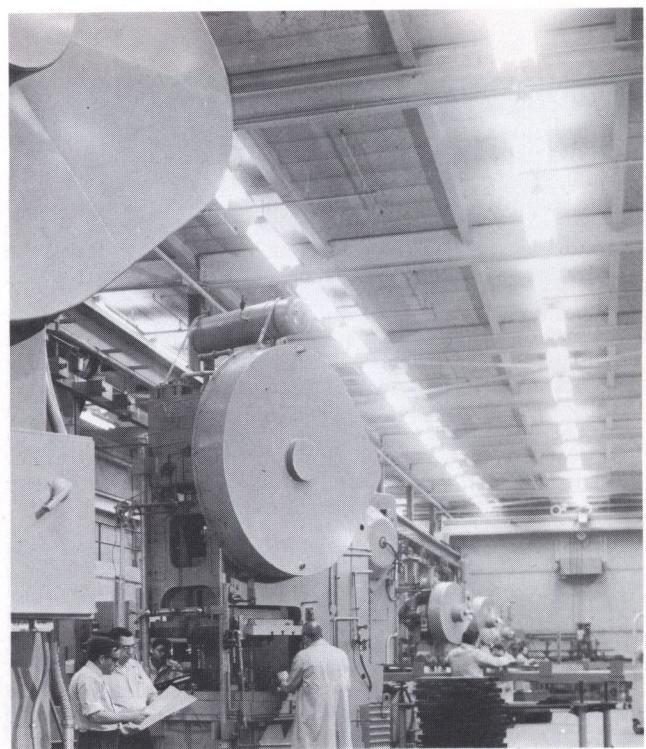
U.S.G. formboards



formboard characteristics

type	SHEETROCK formboard	FIRECODE mineral fiber formboard					asbestos formboard
		custom	economy				
thickness	½"	1"	¾"	1"	1½", 1¾", 2"	¼"	
width	32"	32" & 24"	24"	32" & 24"	32" & 24"	32"	
length	up to 12' max.	4' to 6'8"	4' to 6'8"	4' to 6'8"	4' to 8'	48"	
weight/sq. ft.	2.025	1.65	1.05	1.40	2.15, 2.50, 2.85	2.4	
R-value	0.45	3.70	2.78	3.70	5.55, 6.48, 7.40	0.06	
flame spread	15-20(1)	5-10(2)		0-5(2)		0-5	
noise reduction coefficient	—	.50		.40		—	
light reflection coefficient	66%	65%		—		40%	
specification compliance	ASTM C318-67 C472-70	Federal Spec. SS-L-30D Type V	Federal Spec. SS-S-118a Class 25 (noncombustible)	Federal Spec. SS-S-118a Class 25 (noncombustible)			Federal Spec. SS-B-755a Type U

(1) Flame spread ratings determined by Underwriters Laboratories testing. (2) Flame spread rating determined by Southwest Research Institute.



structural strength

to withstand hurricane winds, wind uplift and roof loads . . .

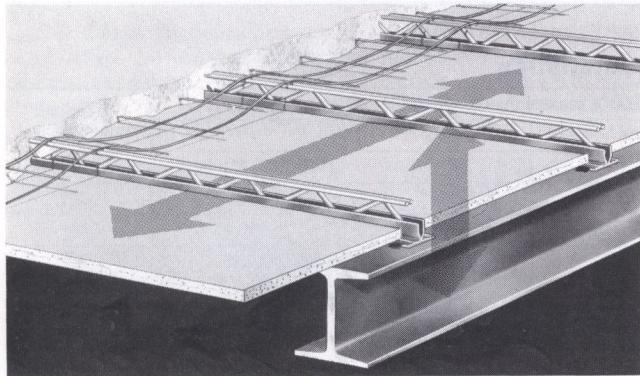
U.S.G. roof deck systems form a monolithic unit that structurally integrates the roof deck with the roof framing. The roof deck is a rigid diaphragm that provides firm resistance to harmonic wave action (as uplift is applied and relaxed).

Gypsum concrete decks have high structural strength and a hard surface. In tests, standard assemblies supported uniform roof loads over 450 psf when wet and 700 psf when dry. At dry densities of 48 to 50 pcf for PYROFILL and 38 to 40 pcf for THERMOFILL, the compressive strength of the slab is 500 psi min. This conforms to ANSI A59.1-1968 and ASTM C317-64 for Class A gypsum concrete; exceeds the strength of other insulating fills; provides a better base for roofing and adequate support for normal roofing equipment.

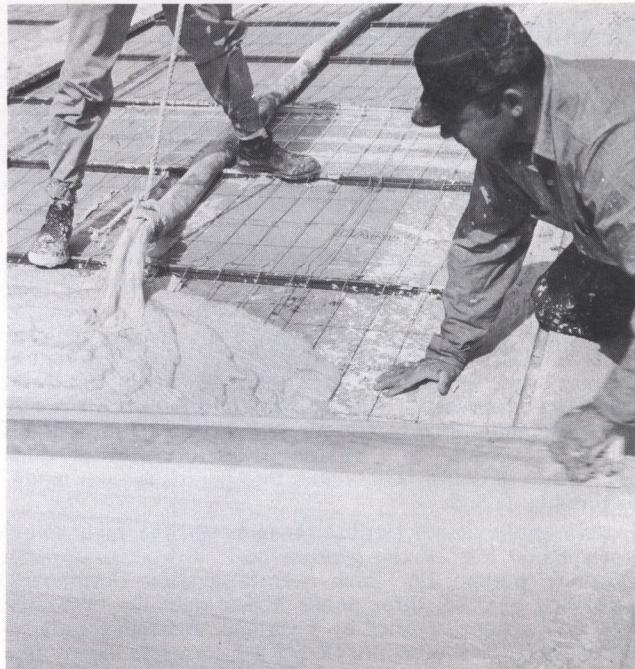
U.S.G. roof decks with long, clear spans require fewer bar joists than steel decks to resist this action which can cause damage to roof coverage and deck. To provide the necessary protection for Types A and B steel decks, the new Factory Mutual Specification 1-28 for Class I Construction, requires added bar joists—also more roof insulation to resist damage to deck caused by foot traffic. Safety factors are also designed into gypsum roof deck components, so they don't have to be added later when cost is greater.

In hurricane areas, such as Florida, standard gypsum roof decks have withstood as many as five fierce blows without damage. This is because U.S.G. roof decks resist uplift action by nearly four times the normal requirements of 35 psf when constructed with bulb or truss tee sub-purlins welded to the primary framing.

UL Wind Uplift Class 90 has been assigned to a poured gypsum concrete roof deck assembly based on qualified testing. The system tested consisted of PYROFILL Gypsum Concrete over SHEETROCK Formboard with bulb tees, KEYDECK mesh and roof covering attached with NAIL-TITE nails. This U.S.G. assembly successfully withstood the rigorous test—while conventional 22-, 20- and 18-ga. steel and lightweight concrete roof deck systems have not. Extended coverage insurance rates are generally lower for assemblies having passed the test, especially in Gulf Coast and Prairie States where high wind velocities are prevalent.



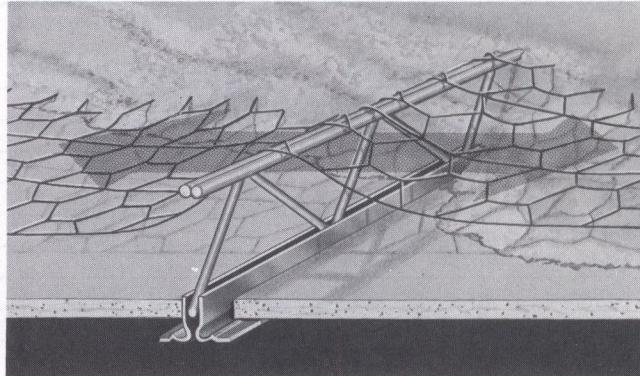
All roof decks are subject to uplift forces and must be anchored to supports to resist this uplift. Although dead load can be considered as part of the total resistance, the chief resistance is obtained by securely welding the sub-purlin to the main purlin at bearing points to transmit slab loads. The reinforcing mesh also absorbs tensile stress, distributes it across the slab, and transmits it to the framing.



to resist seismic shock or to reinforce the building . . .

U.S.G. roof decks provide excellent lateral bracing. They have withstood some of the most severe earthquakes in California and have been approved as rigid diaphragms in Los Angeles and in many of the 1,000 cities which use the Uniform Building Code.

U.S.G. poured gypsum roof decks with bulb tees or truss tees structurally tie the framing system together to reinforce the building and provide resistance to wind and seismic loads—*without extra cost*.



The open web construction allows the gypsum fill to flow through the truss tee so it is embedded in a solid mass of gypsum concrete. This, plus the welding of the truss tee to the supports, provides a strong composite resistance to shear and uplift. Cracking and deflection caused by impact and seismic shock are minimized.

U.S.G. gives more for less... in fire-rated systems

Initial savings can amount to thousands of dollars in construction investment when U.S.G. fire-rated roof decks are specified. A UL 2-hour fire-rated system often costs only 5¢ psf more than a non-rated system... up to 60¢ less than other types of 2-hour UL fire-rated decks. U.S.G. decks enjoy ready acceptance from major code bodies and insurance companies.

in non-rated systems

Savings are achieved through the unique advantages U.S.G. roof decks offer in strength, fire protection and durability. Savings also occur through low "U" values which reduce costs of air-conditioning and electrical heating; and through highly light-reflective U.S.G. formboards which can lower illumination costs. Both these features offer positive measures to conserve energy fuel—to keep their costs from rising—and operating costs from spiraling.

in fast installation

Up to 30,000 sq. ft. of gypsum deck can be poured in one day. The quick-setting action of gypsum concrete permits roofing almost immediately. There's no wait for curing as with ordinary lightweight concrete decks; no costly delays in erection schedules.

U.S.G. roof decks can be poured in cold weather; in any weather in which men can work. The quick-setting action of gypsum concrete makes it one of the best roof deck materials for winter construction. The exothermic reaction in the slab protects it from freezing before set takes place and the slab is capable of carrying design loads.

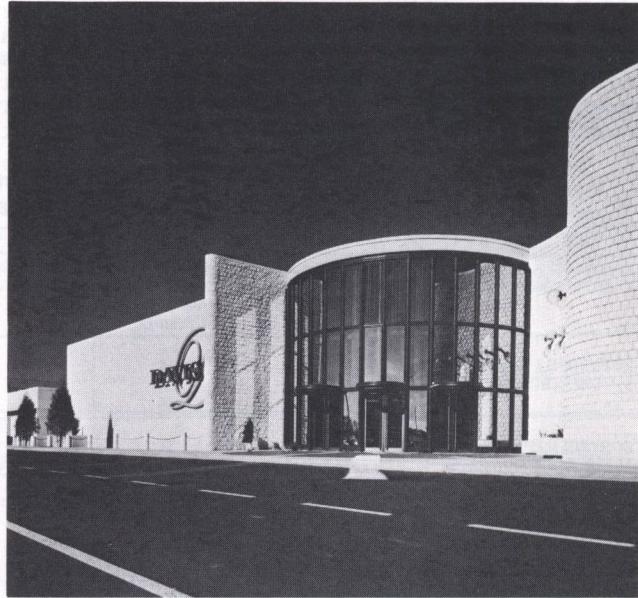
in reduced construction costs

U.S.G. gypsum roof decks meet Factory Mutual Non-combustible Classification to qualify for lowest extended-coverage insurance rates without the clear-span limitations imposed upon steel roof deck designs. With gypsum decks, bar joist spacing can be optimized for major cost reductions over steel and lightweight concrete deck systems.

in insurance savings

Building owners can save up to 55% annually on Property Damage and Business Interruption Insurance when U.S.G. Poured Gypsum Concrete Deck Systems are specified instead of steel deck assemblies, according to a recent study by the National Loss Control Service Corp. This firm developed rate comparisons for gypsum and steel roof decks in five areas of the U.S.A. for shopping centers, manufacturing plants and warehouses both with and without automatic sprinkler pro-

value	80% co-insurance	2-hour gypsum roof deck rate per \$100	steel roof deck rate per \$100	difference per \$100	annual premium savings
property damage insurance (300,000 sq. ft. area—sprinklered)					
building					
\$3,000,000	80%	\$0.08	\$0.177	\$0.097	\$2,328
contents					
\$4,000,000	80%	\$0.08	\$0.177	\$0.097	\$3,104
total fire and extended coverage premium savings					\$5,432
business interruption insurance (\$2,000,000 annual value at 80% of building fire insurance rate)					
\$2,000,000 x .80 x .097/\$100					\$1,552
total annual insurance premium savings					\$6,984



tection (details available on request). The comparison at left below shows almost \$7,000 annual savings for a typical sprinklered industrial plant near Chicago. For the same un-sprinklered building the annual savings are over \$22,000.

in total value

U.S.G. gypsum roof decks are the best value in the industry. They offer maximum economy without sacrificing safety or strength. They resist rot, warpage, and deterioration to cut maintenance costs. They can also reduce continued operating costs such as heating, air conditioning and insurance.

Here's proof U.S.G. roof decks offer more

	steel	mineralized wood fiber	lightweight concrete	PYROFILL poured gypsum
UL-rated assembly	P409 2-hour rating	P403 2-hour rating	P215 2-hour rating	P207 2-hour rating(1)
approx. cost/deck & ceiling only	\$2.00 per sq. ft.	\$2.00 per sq. ft.	\$1.60 per sq. ft.	\$1.35(2) \$1.55(3) per sq. ft.
acoustical properties	minimal (plaster)	minimal (plaster)	NRC .60 to .70	NRC .60 to .70
light reflectance	determined by finish applied	determined by painting	85%—Class A	85%—Class A
year-round construction	yes	yes	only above 40°F.	yes
ceiling	brown coat plaster	finished plaster	½-in. gypsum board over ½" ceramic acoustical tile	½" AURATONE FIRECODE acoustical ceiling panels(4)
lateral restraint lbs./l.f.	300	400	670	1060 KEYDECK mesh, 840 1214 mesh
wind uplift UL Class 90	no	yes	no	yes
insulation U-factor deck & ceiling	.21	.21	.13	.18(1), .11(2)
ceiling flexibility accessibility	none unless access panels installed	none unless access panels installed	fully accessible	fully accessible

(1) Possible extended-coverage insurance advantage. (2) With SHEETROCK Formboard.
(3) With 1" FIRECODE Formboard. (4) 5 different patterns.

thermal insulation

to cut energy costs

U.S.G. poured gypsum decks put high thermal performance where it can be most effective—in the roof. Low "U" factors cut heating/cooling energy costs, save initial equipment costs by lowering capacity requirements, and reduce investment interest and maintenance costs. Needed resistance to heat transmission can often be obtained in a poured gypsum deck

without added insulation. A standard 3-in. deck of PYROFILL Concrete over FIRECODE Formboard provides as much thermal insulation as a steel deck with 1½" rigid insulation. The tables below show design insulation values for various U.S.G. roof deck-ceiling combinations and for roof deck systems with exposed formboards.

design weight and insulation—"U" values (1) (for fire-rated and non-rated decks)

deck system	dry deck weight psf(3)	wood, mineral or perlite roof insul. thickn-in.	"U" values—exposed formboard	"U" values—% AURATONE Panels or Tile(4)		
				no added insul.	plus 2" insul. blankets	plus 3" insul. blankets
2" PYROFILL Gypsum Concrete ½" SHEETROCK Formboard	11	0	.34	.18	.08	.06
		½	.23	.14	.07	.06
		1	.18	.12	.06	.05
		1½	.14	.10	.06	.05
2" PYROFILL Gypsum Concrete 1" FIRECODE Formboard	10	0	.16	.11	.06	.05
		½	.13	.10	.06	.05
		1	.11	.09	.05	.04
		1½	.10	.08	.05	.04
2½" PYROFILL Gypsum Concrete ¼" Asbestos-Cement Formboard	12	0	.37	—	—	—
		½	.25	—	—	—
		1	.18	—	—	—
		1½	.15	—	—	—
2" THERMOFILL Gypsum Concrete ½" SHEETROCK Formboard	8	0	.30	.17	.07	.06
		½	.21	.13	.07	.05
		1	.16	.11	.06	.05
		1½	.13	.10	.06	.05
2" THERMOFILL Gypsum Concrete 1" FIRECODE Formboard	8	0	.15	.11	.06	.05
		½	.13	.09	.06	.05
		1	.11	.08	.05	.04
		1½	.09	.07	.05	.04

deck system	dry deck weight psf(3)	wood, mineral or perlite roof insul. thickn-in.	"U" values—¾" ACOUSTONE Tile or Panels(5)			"U" values—½" SHEETROCK Gypsum Panels(6)			
			"F"	Foil-Back (1)	Foil-Back (2)	Regular	Foil-Back (1)	Foil-Back (2)	plus Acoustical Tile(6)
2" PYROFILL Gypsum Concrete ½" SHEETROCK Formboard	11	0	.17	.13	.07	.24	.16	.07	.16
		½	.14	.11	.06	.18	.13	.07	.13
		1	.12	.09	.06	.14	.11	.06	.11
		1½	.10	.08	.05	.12	.10	.06	.10
2" PYROFILL Gypsum Concrete 1" FIRECODE Formboard	10	0	.11	.09	.05	.13	.11	.06	.10
		½	.10	.08	.05	.11	.09	.05	.09
		1	.09	.07	.05	.10	.08	.05	.08
		1½	.08	.07	.04	.09	.07	.05	.07
2" THERMOFILL Gypsum Concrete ½" SHEETROCK Formboard	8	0	.16	.12	.06	.22	.15	.07	.15
		½	.13	.10	.06	.17	.12	.06	.12
		1	.11	.09	.05	.14	.11	.06	.11
		1½	.10	.08	.05	.11	.09	.05	.09
2" THERMOFILL Gypsum Concrete 1" FIRECODE Formboard	8	0	.10	.09	.05	.13	.10	.06	.10
		½	.09	.08	.05	.11	.09	.05	.09
		1	.08	.07	.05	.09	.08	.05	.08
		1½	.07	.06	.04	.08	.07	.05	.07

(1) Btu/sq. ft./hr./deg. F temp. diff. (includes built-up roofing); for winter conditions—heat flow up, except as noted; (2) summer conditions—heat flow down. (3) Weight of sub-purlin or roofing not included. PYROFILL density: 50 lb. per cu. ft., THERMOFILL density: 39 lb. per cu. ft. (4) Mechanically suspended. (5) Furred suspended. (6) With ¾" ACOUSTONE "F" Tile adhesively applied.

thermal insulation—"U" values (1) (for 2" gypsum concrete over FIRECODE Formboard)

deck system		no insulation		1" insulation		no insulation—% AURATONE Panels or Tile Ceiling (2)	
type of fill	formboard thickness (3)	winter	summer	winter	summer	winter	summer
2" PYROFILL Gypsum Concrete	¾"	.19	.18	.12	.12	.13	.12
	1"	.16	.15	.11	.11	.11	.11
	1½"	.13	.12	.09	.09	.09	.09
	1¾"	.11	.11	.09	.08	.09	.08
2" THERMOFILL Gypsum Concrete	¾"	.18	.17	.12	.11	.12	.11
	1"	.15	.14	.11	.10	.11	.10
	1½"	.12	.11	.09	.09	.09	.09
	1¾"	.11	.10	.08	.08	.08	.08
	2"	.10	.09	.08	.07	.08	.07

(1) Cross tees required for other than purlin lengths. (2) Suspended ceiling and vented space. (3) Sub-purlins should extend min. of ¼" above the top surface of formboard.

design data

SA

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Gypsum Concrete Roof Systems

bulb tee sub-purlins

sub-purlin		total safe uniform load-psf													max. eave overhang	
type	wt.-lbs./lin. ft.	5'0"	5'6"	6'0"	6'6"	6'8"	7'0"	7'6"	8'0"	8'6"	9'0"	9'6"	10'0"	10'6"	11'0"	
112	1.40	67	56	47	40											2'2"
158	1.60	92	76	64	54	52	47									2'9"
168	1.75		109	91	78	74	67	58	51							3'4"
178	2.05			119	101	95	87	76	66	59	52					3'11"
218	3.00						119	103	91	80	72	64	58	52	48	4'10"
228	3.65							129	114	102	91	82	74	74	68	5'10"

Loads based on 3-span condition and 39,600 psi design stress for 112, 158, 168, 178 tees and 33,000 psi for others. Loads are for bulb tee acting alone, live-load deflection L/240 or less and 32% spacing; for 24% spacing, multiply by 1.32. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by tees, calculate overhang separately. For wt./sq. ft., multiply wt./lin. ft. by .49 for 24% tee spacing, .37 for 32% spacing and .25 for 48% spacing.

truss tee sub-purlins

sub-purlin		total safe uniform load-psf													max. eave overhang	
type	wt.-lbs./lin. ft.	5'0"	5'6"	6'0"	6'6"	6'8"	7'0"	7'6"	7'0"	8'6"	9'0"	9'6"	10'0"	10'6"	11'0"	
5-6-17-1½	0.96	65	54	45												2'6"
5-6-17-2	0.96	76	63	53	45	43	39									2'9"
2-5-17-2	1.12	119	90	82	70	67	61	53	46	41						3'5"
2-3-17-2½	1.19			107	91	86	78	68	60	53	47	43				3'7"
1-5-17-2	1.26	129	107	90	76	73	66	57	50	45	40					
1-3-17-2½	1.32			116	98	94	85	74	65	58	52	46	42			
000-5-14-2	1.78						89	77	68	60	54	48	43	39		4'1"
000-3-14-2½	1.85							101	89	78	70	63	57	51	47	

Loads based on 3-span condition, truss tee acting alone, live-load deflection L/240 or less and 32% spacing. For 24% spacing, multiply by 1.32; for 2-span condition, multiply by .8; for single span condition, multiply by .72. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by tees, calculate overhang separately. For wt./sq. ft., multiply wt./lin. ft. by .49 for 24% tee spacing, .37 for 32% spacing and .25 for 48% spacing.

USG sub-purlin

type	wt.-lbs./lin. ft.	total safe uniform load-psf for poured gypsum decks					max. eave overhang
		span					
4'0"	4'6"	5'0"	5'6"	6'0"			
20-ga.	0.73	75					1'8"
18-ga.	0.95	90	90	73			2'3"
16-ga.	1.18	90	90	77	64	54	2'4"

Loads are for sub-purlin composite construction and based on continuous span condition, deflection L/240 or less and 32½" o.c. spacing. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by sub-purlins, calculate overhang separately.

type	wt.-lbs./lin. ft.	sub-purlin spacing	total safe uniform load-psf for precast roof deck units					max. eave overhang
			span					
4'0"	4'6"	5'0"	5'6"	6'0"				
20-ga.	0.73	24"	38	30				
18-ga.	0.95	24"	55	43	35	29		
		32"	41	33				
16-ga.	1.18	24"	60	54	44	36	30	
		32"	51	41	33			

Loads based on 3-span condition, sub-purlin acting alone and max. allow. 60 psf superimposed load for plank. Loads shown will not exceed L/240 or sub-purlin design stress. Subtract weight of plank and roof covering to find live-load capacity.

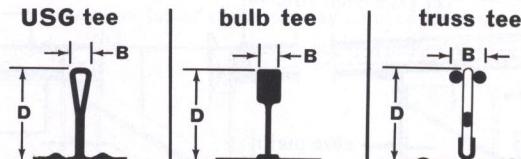
nail-holding power (1)

description of nail	PYROFILL gypsum concrete			THERMOFILL gypsum concrete			max. eave overhang
	removal -1 day	removal -7 days	removal -slab dry	removal -1 day	removal -7 days	removal -slab dry	
1½" ES NAIL-TITE —plain finish (2) (1¼" penetration)	67(3)	77	136	60(3)	67	141	

(1) Resistance to direct pull in lbs., for nails placed 24 hrs. after pouring slab. Test slabs had 2" min. thickness and dry density of 48 pcf for PYROFILL and 38 pcf for THERMOFILL. Nailholding power decreased at densities less than those cited.

(2) Manufactured by E. S. Products, New Rochelle, N.Y., and recommended for smooth coat type roofing.

(3) Provides min. 40 lbs. immediate holding power required by roofing manufacturers.



physical properties (dimensions in inches)

USG and bulb tees

type	B	C	D
USG	2¹/₆₄	1½	1¾
112	³/₈	1½	1½
158	³/₈	1⁹/₁₆	1⁹/₈
168	⁷/₁₆	1½	2
178	⁹/₁₆	1⁹/₈	2
218	¹¹/₁₆	2¹/₈	2¹/₈
228	⁷/₈	2¹/₁₆	2⁵/₁₆

truss tee

type	B	D	chord wire gage
5-6-17-1½	⁹/₁₆	1¾	5
5-6-17-2	⁹/₁₆	2	5
2-5-17-2	²¹/₃₂	2	2
2-3-17-2½	²³/₃₂	2½	2
1-5-17-2	²³/₃₂	2	1
1-3-17-2½	³/₄	2½	1
000-5-14-2	⁷/₈	2	000
000-3-14-2½	²⁹/₃₂	2½	000

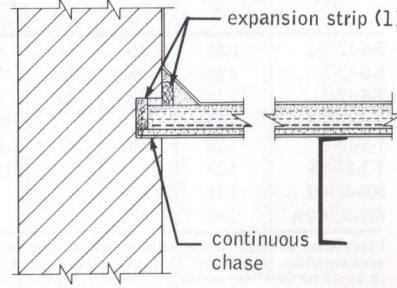
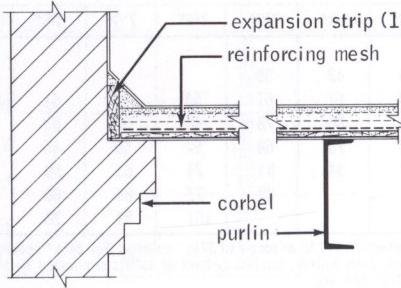
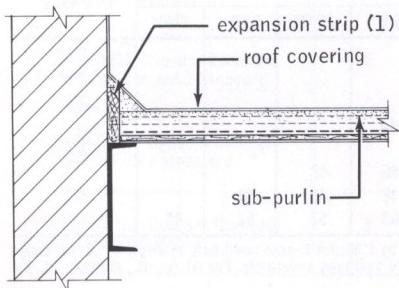
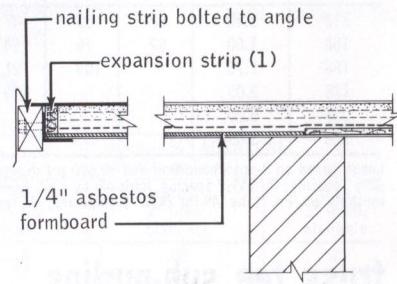
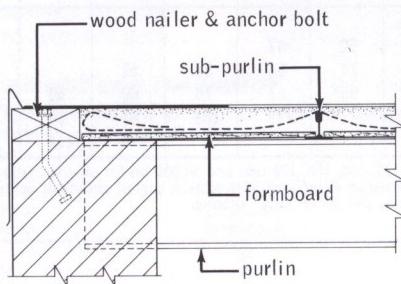
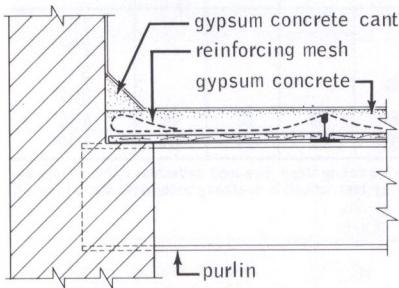
Properties shown are taken from data furnished by manufacturer.

details

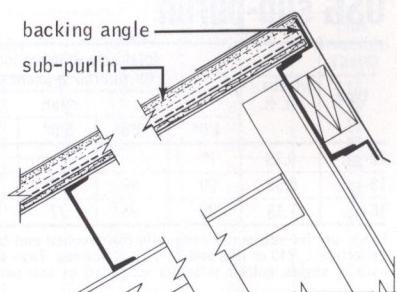
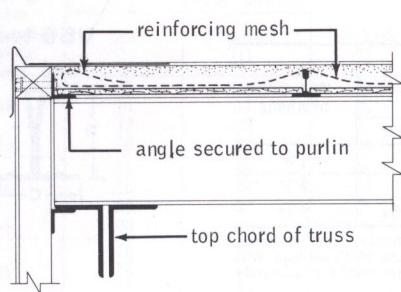
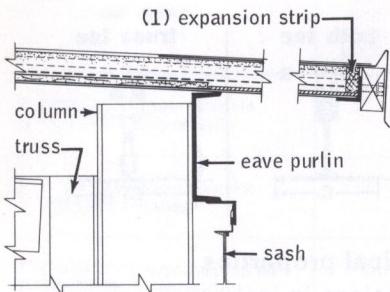
scale: $\frac{3}{4}'' = 1'-0''$

application over beams and bar joists

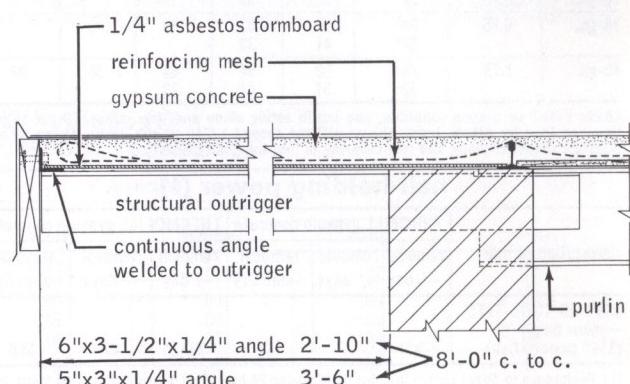
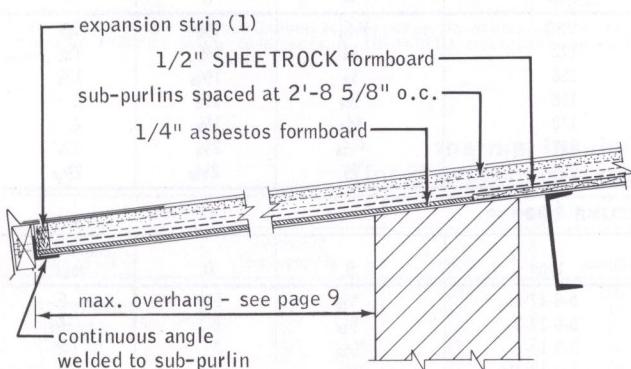
wall details



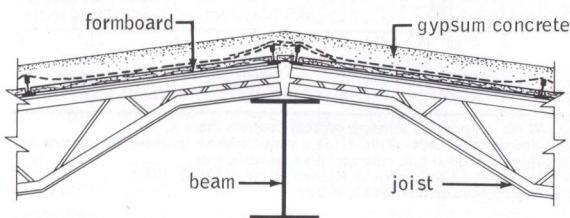
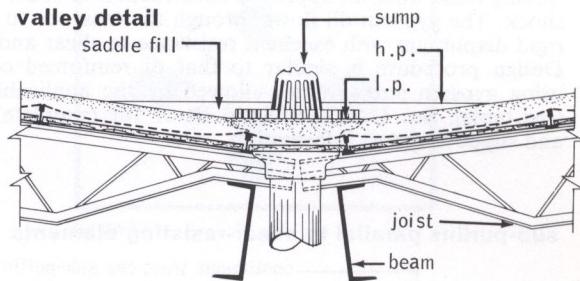
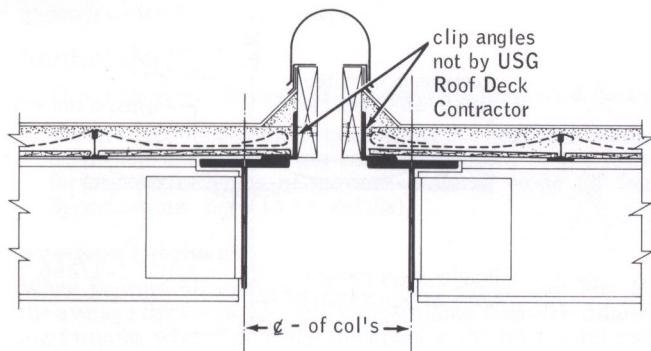
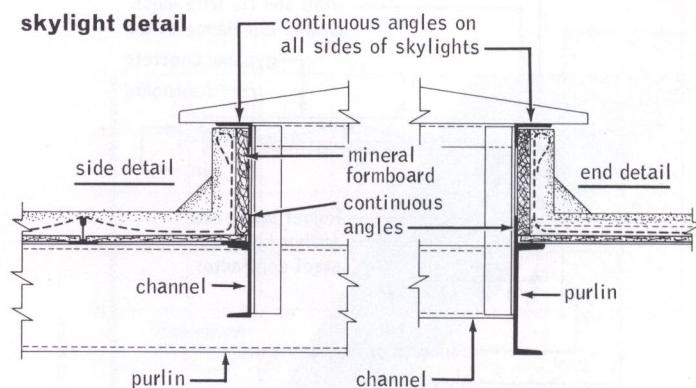
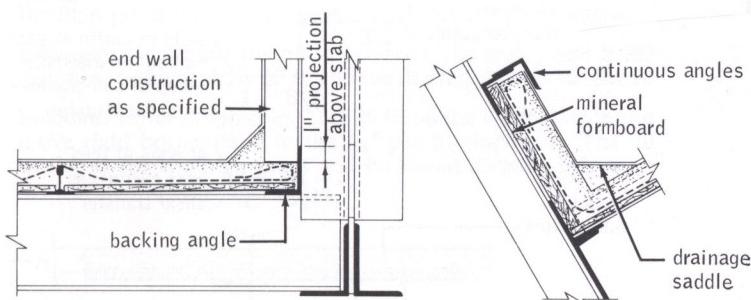
eaves



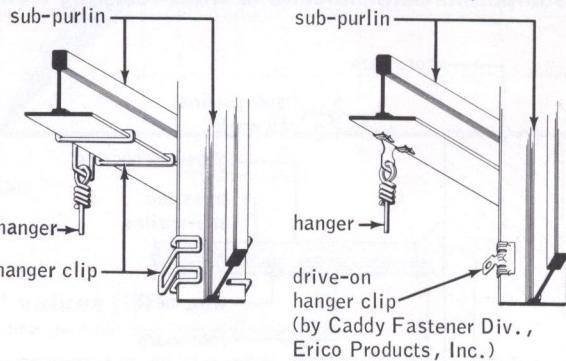
eave & gable overhang (overhang based on 45#/ft' total load)



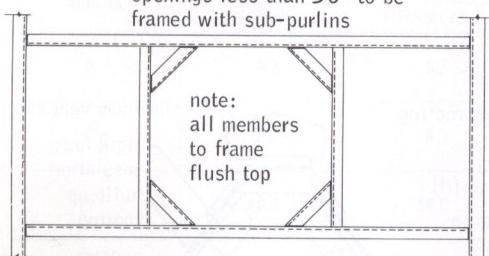
(1) Expansion strips are not recommended for seismic Approved Diaphragm design. See page 12 for Seismic Detail.

detailsscale: $\frac{1}{4}'' = 1'-0''$ **Gypsum Concrete Roof Systems****application over beams and bar joists****ridge detail****valley detail****expansion joint****skylight detail****curbs****hanger details for suspended ceilings**

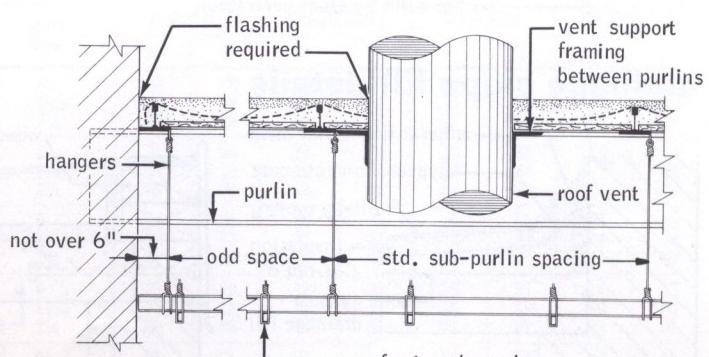
hanger and hanger clips - not by USG Roof Deck Contractor
(a convenient lather's wire tie may be used for suspension)

**typical framing around openings larger than 30"**

openings less than 30" to be framed with sub-purlins



Note: all miscellaneous structural steel, such as channels, wood nailers, angles, hangers and channel grillage, attached to roof framing, are not by USG Roof Deck Contractor.

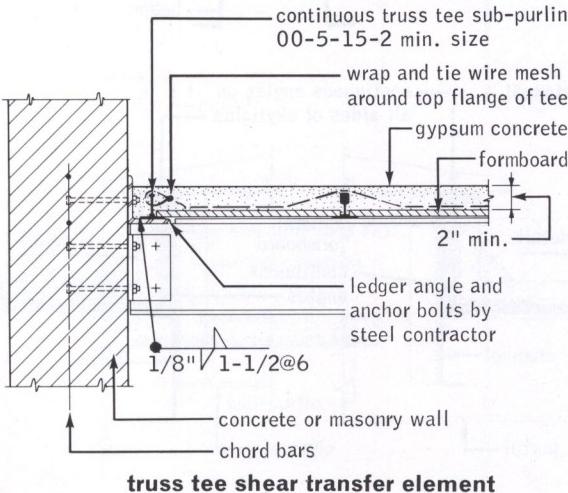
**suspended ceilings**

approved seismic diaphragm

scale: $\frac{3}{4}'' = 1'-0''$

U.S.G. poured gypsum roof decks with truss tees and reinforcing mesh offer an approved construction to resist seismic shock. The gypsum fill flows through the truss tee to form a rigid diaphragm with excellent resistance to shear and uplift. Design procedure is similar to that of reinforced concrete using gypsum stress values allowed by the applicable code (see table). See U.S.G. Bulletin IR-61 for complete design and supporting test information.

sub-purlins parallel to shear-resisting elements



allowable shear—reinforced gypsum concrete

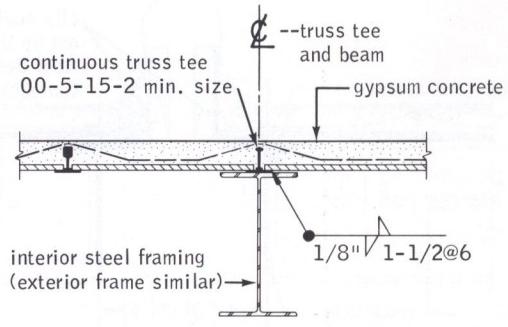
gypsum concrete thickness, in. (1)	reinforcing mesh type	allowable shear values, lbs. per lin. ft. (2)	
		PYROFILL (3) with truss tees	THERMOFILL (4) with truss tees
2	4"x8" #12—#14	840	710
2	KEYDECK	1060	910
2½	4"x8" #12—#14	890	760
2½	KEYDECK	1120	960

(1) Based on 500 psi compressive strength gypsum concrete Class A.

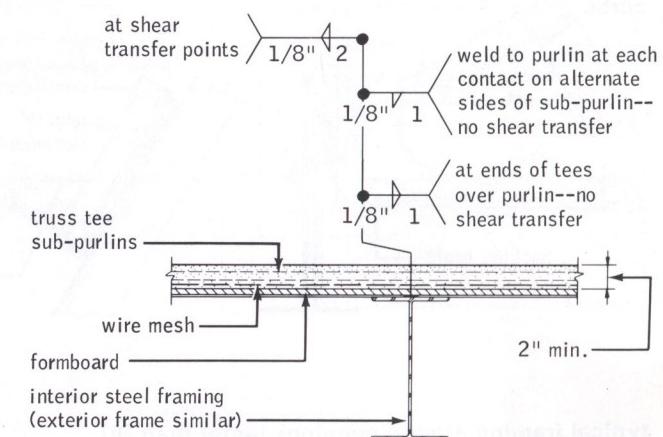
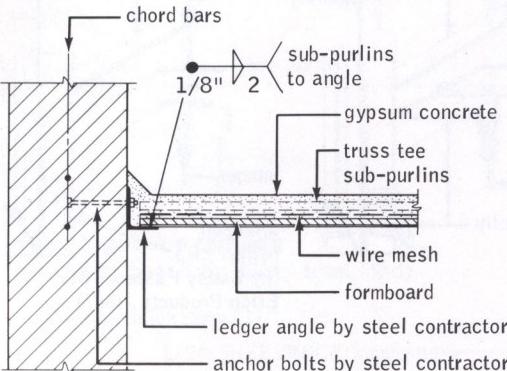
(2) California Administrator Code—Title 21 data varies slightly in shear calculations and field application. Consult U.S.G. representative for assistance.

(3) See UBC Std. No. 24-13 and Research Recommendation 1312.2, ICBO.

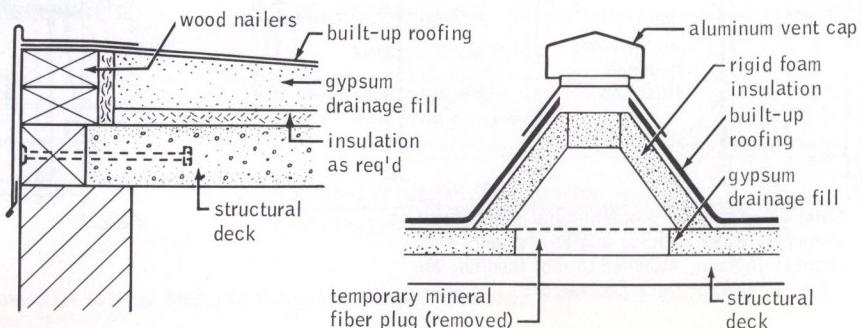
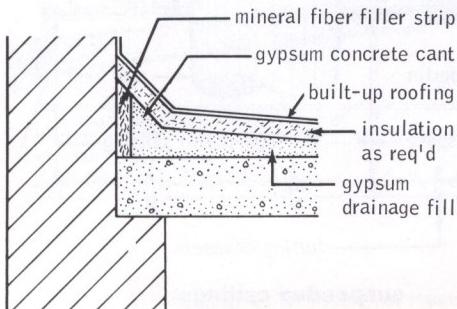
(4) See Research Recommendation 1683.2, ICBO.



sub-purlins perpendicular to shear-resisting element



drainage slope fill details



drainage slope fill

SA

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Gypsum Concrete Roof Systems

the low-cost fireproof assembly for simple, fast, all-weather installation

In this assembly, gypsum concrete is mechanically mixed, poured-in-place over flat decks and screeded to provide proper drainage. Applied in thicknesses from 2" to 8" when roofing is directly attached—from 0" to 8" when roof insulation is adhesively applied atop the fill. Suitable for use over poured concrete, wood, precast concrete or cement tile decks, gypsum concrete in new construction or remodeling. Sets up quickly into a smooth monolithic slab ready for immediate roofing. Also may be installed over polystyrene or polyurethane rigid roof insulation where greater thermal resistance is required. Most features of U.S.G. roof deck systems are available with gypsum concrete drainage slope fill.

limitations

1. Drainage slope fill systems are not structural roof decks.
2. Certain recommendations concerning roofing, ventilation, expansion and contraction must be adhered to for satisfactory performance of gypsum drainage slope fill (see Specifications, page 14 for details).

average thickness

When gypsum fill is sloped to an inside drain, (see Fig. 1), the average thickness (t_a) can be determined from the following formula, where (t_h) is the thickness at the high point and (t_l) is the thickness at the low point:

$$t_a = \frac{2}{3} (t_h - t_l) + t_l$$

fill thickness

The graph (Fig. 2) may be used to determine fill thickness at the high point for various slopes and horizontal distances.

Example: Determine the fill thickness at the high point if the distance to the drain is 20 ft. and the desired slope is $\frac{1}{8}$ " per ft.

Solution: Enter graph (Fig. 2) at 20 ft. on the vertical scale and move right horizontally to the $\frac{1}{8}$ " per ft. slope line. The fill thickness for the high point will be found directly below on the horizontal scale and is $2\frac{1}{2}$ ".

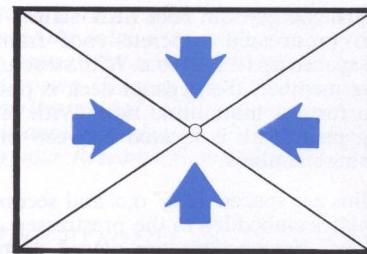


figure 1

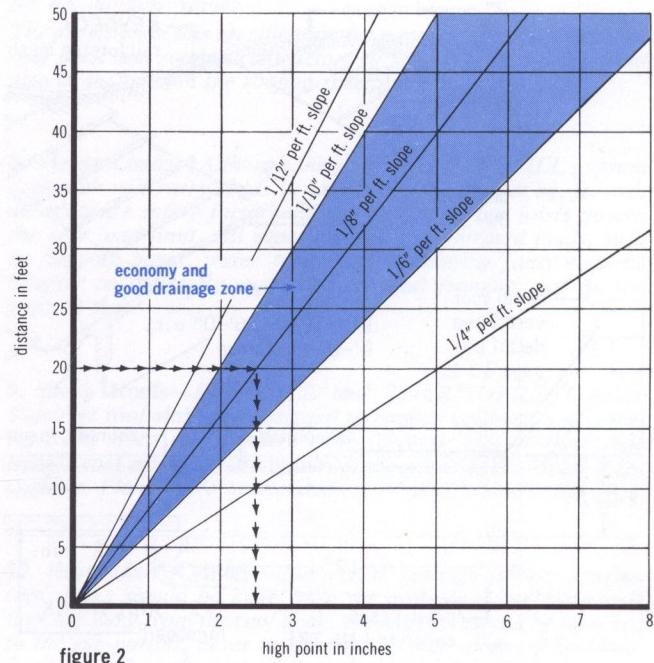


figure 2

thermal transmission—"U" values (1)

(for gypsum concrete drainage fill and rigid cellular polystyrene or glass fiber insulation over 6" concrete roof deck)

average thickness gypsum fill—in.	dry slab wt.—psf(2)		insulation thick.-in.		no ceiling—deck exposed				$\frac{5}{8}$ " AURATONE Panels or Tile			
			poly- styrene	glass fiber	PYROFILL		THERMOFILL		PYROFILL		THERMOFILL	
	PYROFILL	THERMOFILL			W	S	W	S	W	S	W	S
2	8.3	6.7	0 1 2	0 $1\frac{1}{16}$ $2\frac{1}{4}$	.34 .15 .09	.30 .14 .09	.30 .14 .09	.27 .13 .09	.18 .11 .07	.16 .10 .07	.17 .10 .07	.15 .10 .07
$2\frac{1}{2}$	10.4	8.3	0 1 2	0 $1\frac{1}{16}$ $2\frac{1}{4}$	.31 .14 .09	.27 .13 .09	.27 .13 .09	.24 .12 .08	.17 .10 .07	.15 .10 .07	.15 .10 .07	.14 .09 .07
3	12.5	10.0	0 1 2	0 $1\frac{1}{16}$ $2\frac{1}{4}$	.28 .13 .07	.25 .13 .09	.24 .12 .08	.22 .12 .08	.16 .10 .07	.14 .09 .07	.14 .09 .07	.13 .09 .07
$3\frac{1}{2}$	14.6	11.7	0 1 2	0 $1\frac{1}{16}$ $2\frac{1}{4}$	.25 .13 .09	.23 .12 .08	.22 .12 .08	.20 .11 .08	.15 .10 .07	.14 .09 .07	.14 .09 .07	.13 .09 .06
4	16.7	13.3	0 1 2	0 $1\frac{1}{16}$ $2\frac{1}{4}$	.23 .12 .08	.21 .12 .08	.20 .11 .08	.18 .11 .08	.14 .09 .07	.13 .09 .07	.13 .09 .06	.12 .08 .06

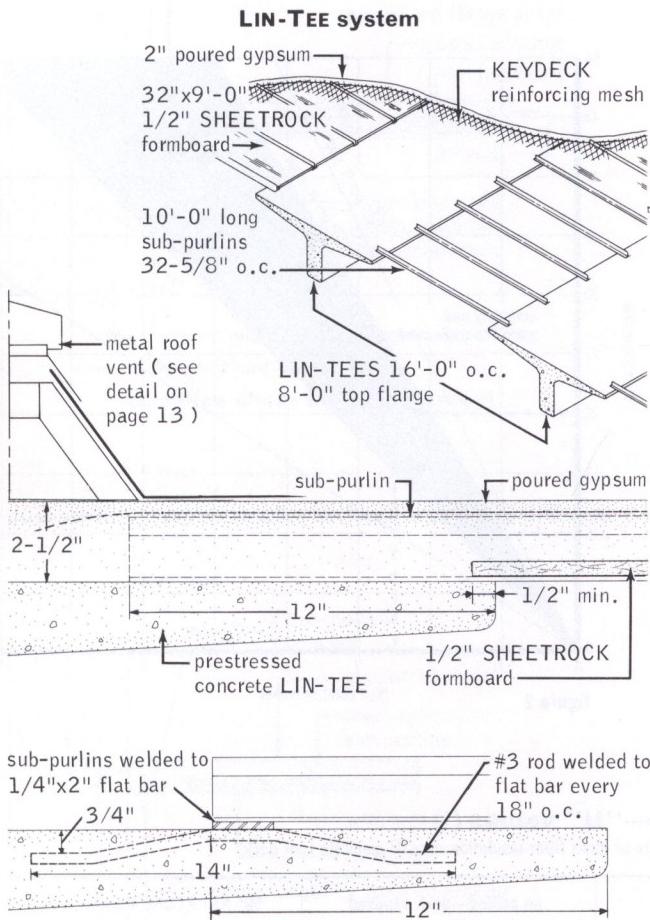
(1) Btu/sq. ft./hr./deg. F. temp. diff. (includes built-up roofing); W—for winter conditions, heat flow up; S—for summer conditions, heat flow down.

(2) Weight is for gypsum fill only.

USG roof deck systems with prestressed concrete roof framing

In these systems the gypsum roof deck slab is used in combination with prestressed concrete roof framing sections which may be spaced up to 16 ft. o.c. With structural units such as the LIN-TEE member, the gypsum deck is poured over the entire area to form a monolithic slab. With alternate types of units the gypsum slab is located between the prestressed concrete framing members.

Steel sub-purlins are spaced 32 $\frac{5}{8}$ " o.c. and securely welded to steel bars or plates embedded in the prestressed concrete roof framing sections. Formboards are placed atop the bottom flanges of the sub-purlins. Reinforcing mesh is laid over the entire area in the LIN-TEE systems; only across the sub-purlins when precast concrete members are used. Metal roof vents



specifications

notes to architect

1. Formboards should always be stored in a dry place. The normal moisture from a gypsum concrete slab has no effect on the performance of the formboards. However, soaking of the formboard prior to the pouring of the slab can result in excessive deflection. The roof covering should be applied as soon as possible after erection to protect the construction from precipitation. Discoloration or staining of the formboard may occur if subjected to prolonged exposure to moisture. If staining will be objectionable, the formboard may be painted; see recommendations below.

2. Drying—Gypsum concrete roof slabs dry out from the underside (through the formboard). Adequate heat and ventilation

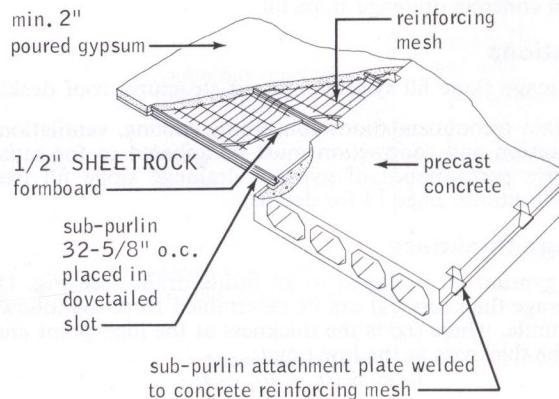
are installed atop fill over LIN-TEE members to release vapors.

Gypsum roof decks used in combination with prestressed precast concrete structural elements provide a number of highly desirable features:

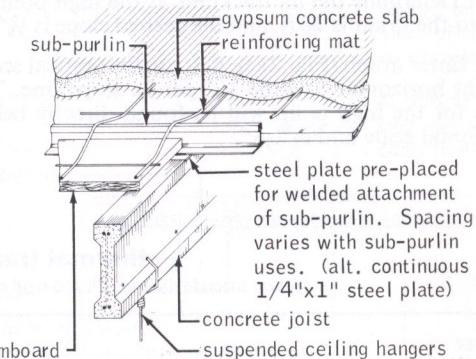
1. Clear spans up to 100 ft. with shallow structural depths.
2. Noncombustible construction without added fireproofing.
3. Simplicity of construction for fast erection.
4. Economical initial cost and low maintenance.

These features make this system ideal for use where long clear unsupported spans are required such as in warehouses, shopping centers and school gymnasiums. See U.S.G. Bulletin IR-51 for detailed specification.

precast concrete member system



roof attachment to concrete joists



below the slab are required to permit the escape of this moisture. In buildings without windows or with fixed windows, adequate mechanical (forced) ventilation is required to remove all construction moisture. Gypsum used as a drainage fill over concrete slabs, steel decks and other decks of low permeability must have metal roof vents installed atop fill; see recommendations below.

3. Ventilation should be provided for any plenum or joist space between all roof deck and ceiling constructions. The venting of enclosed air spaces should be accomplished by natural or artificial means, both during and after construction of the building. Such venting accomplished by roof vents or soffit louvers to the

Gypsum Concrete Roof Systems

outside does not appreciably affect plenum or interior temperatures. Consult the Heating, Ventilating & Air Conditioning Guide, latest edition, published by the American Society of Heating, Refrigerating & Air Conditioning Engineers, for data on ventilating attic spaces and location of vapor barriers.

All gypsum concrete drainage slope fills applied over unvented roof decks and gypsum slabs over LIN-TEES must have metal roof vent installed atop fill to release expanding gases and vapors. Vents should be as manufactured by O. O. McKinley Co. or equal. One vent with 6" minimum stack diameter should be used for venting each: 1,000 sq. ft. of fill, 2" to 4" thick; 750 sq. ft. of fill, 4" to 6" thick; and 500 sq. ft. of fill, 6" to 8" thick. On small areas or over LIN-TEES, at least two vents should be used. Space beneath roof vent should be void of fill down to the structural deck or roof insulation. Vents may be removed after a period of 18 months if inspection reveals the fill has dried sufficiently and the roofing has performed satisfactorily.

4. Decorating—Gypsum roof decks provide a presentable undersurface that usually does not require further decorating. Where the formboard is to be left exposed and appearance of the formboard is critical, further decoration may be necessary.

When decoration is desired, painting should not be done until the slab is thoroughly dry. Before painting, the slab should be checked for dryness throughout its entire thickness. An electric type moisture meter can be used if contacts are driven well into interior of slab. Exposed metal, such as sub-purlin flanges, should be protected with METAL COAT Zinc Chromate Primer before finish coats are applied.

For SHEETROCK Formboards, a breather type paint such as TAL Latex Wall Paint is recommended, applied by brushing, rolling or spraying. A fungicide must be added to the TAL Latex Paint. For FIRECODE Mineral Fiber Formboard, use 1 or 2 coats of PRO-KYD Alkyd Flat Paint with fungicide added. GRAND PRIZE Latex House Paint is recommended on asbestos cement formboard, and does not require additional inhibitor. For fungicides in other paints, check manufacturer's specific recommendation. If surface damage defaces painted formboard, patch with DURABOND Paste Spackling Putty and paint (per instructions above) to restore original appearance. See U.S.G. Paint Products Folder SA-933 for paint specifications.

5. Expansion and Contraction—PYROFILL and THERMOFILL Gypsum Concrete roof decks, like all roof decks, are subject to expansion and contraction due to temperature changes. Bulb tees welded to steel framing limit slab movement that would exert itself at right angles to the direction of the bulb tees. The following is suggested as a guide:

- a. Provide expansion joints in the deck or drainage fill and the roofing wherever they are provided in the main structure.
- b. Long narrow buildings should have expansion joints through the deck and the supporting structure spaced not more than 200 ft. apart.
- c. Wings of "L", "U" and "T"-shaped buildings should be separated with expansion joints.
- d. A mineral fiber filler strip should be installed at all structural roof penetrations and at walls crossing the ends of sub-purlins. See details on pages 10 and 11; note seismic design recommendations.

To resolve specific problems, the coefficients of linear expansion should be considered. They are: for gypsum concrete, .0000085 in./in./F°; for steel, .0000065 in./in./F°. See Steel Construction Manual of the A.I.S.C., for method of calculating expansion of bodies by heat.

6. Uplift—All roof decks are subject to uplift forces and must be anchored to supports to resist this uplift. In developing adequate resistance, the total dead load of the roof deck can be considered as part of the total resistance. In laboratory tests, PYROFILL Gypsum Concrete roof decks, using steel rails or bulb tee sub-purlins welded to the steel framing, have an average uplift resistance equivalent to more than 125 lbs. per sq. ft. Reference: Armour Research Foundation Test M1068.

7. Roofing—Once PYROFILL and THERMOFILL have set, the complete built-up roof covering should be installed as soon as practical but not later than two days after pouring to protect the fill from excessive wetting from rain or snow and to develop optimum nail holding power. For built-up roofing application direct to fill, a min. 40-lb. coated base sheet, or equal, nailed dry is preferred for the first ply. Drive nails into wet slab as soon as possible; rusting increases holding power. See table, page 9, for nail-holding values.

The provision in this specification for a meeting between general, roof deck and roofing contractors to schedule the work should also be included in the roofing specification.

8. Heavy Loads—Although the reinforced PYROFILL gypsum deck slab will carry loads in excess of 100 lbs. per sq. ft. with an adequate safety factor, the sub-purlins or bar joists govern the safe load limit. All superimposed concentrated loads, such as flagpole bases, water tanks and ventilating fans, must be directly or indirectly supported on steel framing, not on the gypsum slab.

9. Steep Roofs—PYROFILL and THERMOFILL Gypsum Concrete roof slabs are designed to receive built-up roof coverings. On steep roofs, where slate, ceramic tile or rigid type shingle roof coverings are required, the use of USG Metal Edge Gypsum Plank is recommended (see U.S.G. Folder SA-306).

10. Suspended Ceilings—Suspended ceilings under gypsum roof decks should be hung from the structural steel frame. If they are hung from the roof deck, the hangers should be attached to the sub-purlins, never to the gypsum slab alone. When hung from the sub-purlins, the sub-purlins must be capable of supporting the total weight including the ceiling load with a resultant deflection not to exceed 1/360 of their span. Attachment hangers and channel grillage are not furnished by the U.S.G. Roof Deck Contractor. See U.S.G. System Folders in this series for descriptions and details of ceiling assemblies.

11. U.S.G. Certified Roof Decks—United States Gypsum will, upon request, certify PYROFILL and THERMOFILL Gypsum Concrete and USG Formboards when used together in a roof deck. Specimens of the fill are taken during application and tested at the factory for dry density and compressive strength in accordance with ASTM C472. After completion of testing and the job, U.S.G. and the contractor issue a certificate stating the poured gypsum concrete and formboards were applied according to requirements and specifications.

12. U.S.G. Metal Edge Gypsum Plank—See U.S.G. System Folder SA-306 in this series for gypsum roof plank design data, application details and specifications.

13. U.S.G. Laminated Roof Decks—See U.S.G. Folder IR-564 for Laminated Gypsum Roof Plank design data, erection details, deck installation and specifications.

Part 1: general

1.1 scope—Specify as required to suit project conditions.

1.2 qualifications

Installation of poured gypsum roof deck and drainage slope fill shall be by a U.S.G.-approved roof deck contractor.

1.3 submittals

a. The roof deck contractor shall prepare and submit shop drawings before the work begins. These shop drawings shall be in agreement with poured roof deck specifications and details as provided in current U.S.G. System Folder on Gypsum Concrete Roof Systems.

b. Where Certified Roof Deck is requested, contractor shall submit to United States Gypsum roof deck specimens taken from job; these specimens shall meet standards established for a U.S.G. Certified Roof Deck.

c. Prior to pouring gypsum deck, representatives of the general contractor, roof deck contractor and roofing contractor shall meet and agree to procedures and coordination of operations to insure that decking is roofed within 48 hours after pouring.

1.4 delivery and storage of materials

All materials shall be delivered in their original unopened packages or bundles and stored off the ground and in a place providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.5 environmental conditions

a. Ventilation shall be provided for any plenum or joist space between roof deck and ceiling assemblies. The venting of enclosed air spaces shall be accomplished by natural or artificial means, both during and after construction of the building.

b. Surfaces to receive gypsum concrete drainage slope fill shall be dry and free of frost and ice.

Part 2: products

2.1 sub-purlins: (USG Sub-purlin 20) (USG Sub-purlin 18) (USG Sub-purlin 16) (bulb tees produced from prime billet steel or rail steel ASTM A499) (KEYDECK Truss Tees) cleaned and painted with one coat rust-resistant primer.

2.2 cross tees: 1 1/4" x 1/2" x 0.023" thick sheet metal, hot rolled or formed and (painted) (galvanized).

2.3 permanent formboards (select as required):

- a. SHEETROCK Formboard, 1/2" thick, 32" wide, treated, in lengths equal to main purlin spacings (12' max.).
- b. FIRECODE Mineral Fiber Formboard (Custom) (Economy), (3/4") (1") (1 1/2") (2") thick by (24") (32") wide (select lengths from table, page 5).
- c. Asbestos Cement Formboard, 1/4"x32"x48".

2.4 reinforcing mesh: 48-1214 galvanized steel, welded wire mesh or KEYDECK galvanized steel, woven wire mesh. Effec-

tive cross-sectional area of mesh at right angles to sub-purlins shall be not less than 0.026 sq. in. per ft. of mesh width.

2.5 gypsum concrete: (PYROFILL) (THERMOFILL) mill-formulated, composed of calcined gypsum and aggregates to comply with ANSI A59.1-1968 and ASTM C317-64 (1970) standards.

2.6 water: Potable and not contain impurities that affect the setting of gypsum.

2.7 mixes: Gypsum concrete shall be mixed with clean water only, using (8 1/2 gallons per 80 lbs. PYROFILL Concrete) (8 gallons per 67 lbs. THERMOFILL Concrete).

Part 3: execution**3.1 condition of surfaces**

Prior to drainage fill application, contractor shall examine thoroughly all surfaces to receive fill. The contractor shall report to the architect or owner's agent in writing any defects considered detrimental to proper application of fill so defects can be remedied before fill is applied.

3.2 sub-purlin installation

Place and weld each sub-purlin to main purlins at each contact point. Attach USG Sub-purlins with 3/8" welds through web and flanges. For bulb tees and truss tees, use fillet welds 1/2" min. length placed on alternate sides of sub-purlins where accessible. All end joints are to bear on roof supports (stagger line of end joints).

3.3 formboard installation

Place formboards on sub-purlin flanges with all end or cross-joints supported, forms to fit neatly on all four edges. Cut forms to fit at walls, curves and openings as required. Install cross tees to support end joints of square-edge formboards not supported by roof framing. Lay no more formboard than can be covered by completed slab on same day.

3.4 reinforcement placement

Place reinforcing mesh with heaviest wires at right angles to sub-purlins. If KEYDECK is used, place 16-ga. wires at right angles to sub-purlins. Lap mesh ends at least 6"; do not lap sides of mesh. For fire-rated assemblies, lap mesh sides (4") (6"). Cut mesh to fit at wall, curbs and openings and carry mesh into all areas where gypsum concrete is poured.

3.5 gypsum concrete deck installation

Mix gypsum concrete and pour to minimum depth of 2" over formboards, 1/4" over sub-purlins. Scree all surfaces to a smooth, even plane ready to receive waterproof roof covering specified in another section. After pouring, leave roof deck free and clean for other trades.

3.6 drainage slope fill installation

Mix gypsum concrete fill and pour over deck or roof insulation to the required thicknesses shown on the drawings. Scree all surfaces to a smooth, even plane ready to receive roof covering. Install mineral fiber filler strips at all structural roof penetrations and waxed fiberboard cylinders or mineral fiber plugs at roof vent locations as shown on the drawings. Pour cants and curbs as shown or required. After pouring, remove fiberboard cylinders and plugs; leave roof deck free and clean for other trades.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, PYROFILL, THERMOFILL, SHEETROCK, FIRECODE, AIRSON, ACOSTONE, AURATONE, DURABOND, PRO-KYD, METAL COAT, GRAND PRIZE.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

water-resistant gypsum plank for flat, pitched, mansard and fire-rated roof decks

USG Metal Edge Gypsum Plank offers a specially developed water-resistant core as an advantage never before available. With this unique roof plank, there is no worry about the core picking up moisture—no damage to exposed surfaces. It also offers the fire resistance, economy, structural strength and fast installation needed today.

description

USG Metal Edge Gypsum Plank is a precast structural roof deck unit 2" thick, 15" wide and 10 ft. long which weighs approximately 13 psf and is reinforced with galvanized steel tongue-and-groove edges and 16-ga. galvanized wire mat. It is erected over steel, concrete or wood joists to form a high-strength, structurally reinforced roof deck ready for application of roofing material. It can be used for factories, schools, shopping centers, or practically any type of building.

Plank is available for spans up to 7 ft. (see design properties, page 2 for load-carrying capacities). The plank conforms to Federal Specification SS-T-315a, Type I and ASTM C377-66.

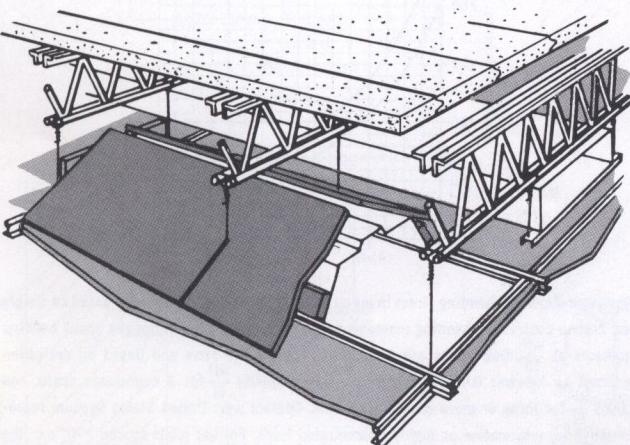
With USG Metal Edge Gypsum Plank, no added bar joists are required to comply with Factory Mutual Research Corp. Roof Deck Specification 19825. Optimum bar joist spacing reduces in-place costs of deck and joists and still qualifies for lowest insurance rates.

water resistance

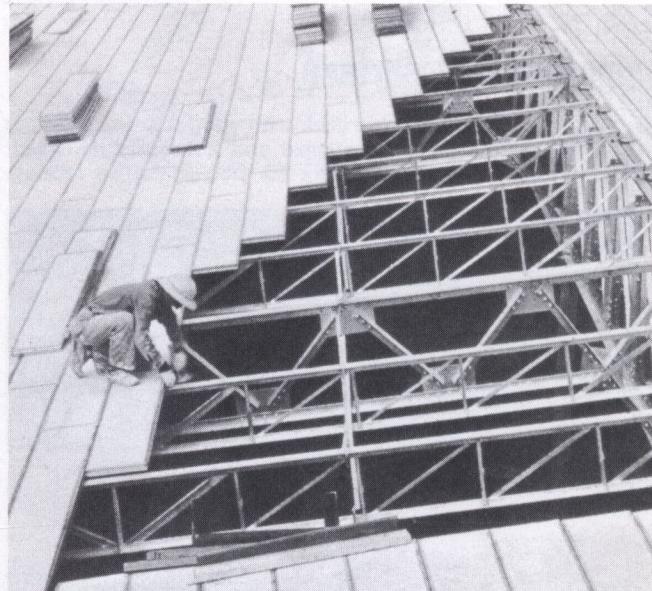
The plank's specially developed core materially decreases water absorption as compared to a conventional untreated gypsum core. Results of tests simulating a 1.5-in. rainfall in one-half hour reflected a gain in weight by moisture of only 1% and no surface damage or softness.

2-hour fire resistance

These assemblies provide a choice of 2-hour rated roof/ceiling designs: (1) UL Design No. P213 with acoustical panel ceiling



**UL Design No. P213
(was RC-22-2 Hr.)**

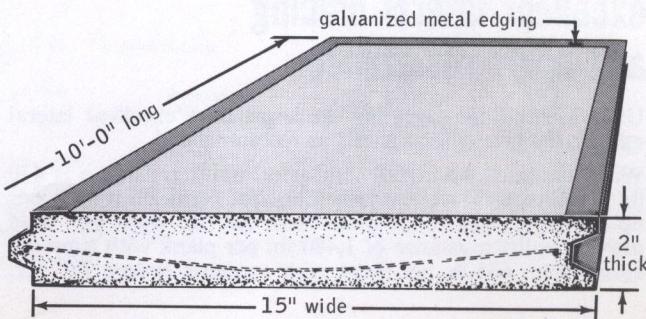


reduces insurance rates as much as 45%; (2) UL Design No. P501, the only roof/ceiling design with a gypsum panel ceiling.

1. UL Design No. P213—USG Metal Edge Gypsum Plank clipped or welded to bar joists spaced up to 7'0" o.c., $\frac{3}{4}$ " noncombustible roof insulation, light fixtures and air dampers, and $\frac{5}{8}'' \times 2' \times 4'$ AURATONE FIRECODE Ceiling Panels on a fire-rated exposed grid suspension system.

2. UL Design No. P501—USG Metal Edge Gypsum Plank clipped or welded to bar joists spaced up to 4'0" o.c., $\frac{3}{4}$ " noncombustible roof insulation, USG Metal Furring Channels 24" o.c. wire-tied to joists, $\frac{5}{8}$ " SHEETROCK FIRECODE "C" Gypsum Panels screw-attached to channels, joints unfinished or taped.

Plank weight: 13 psf; thickness: 2".



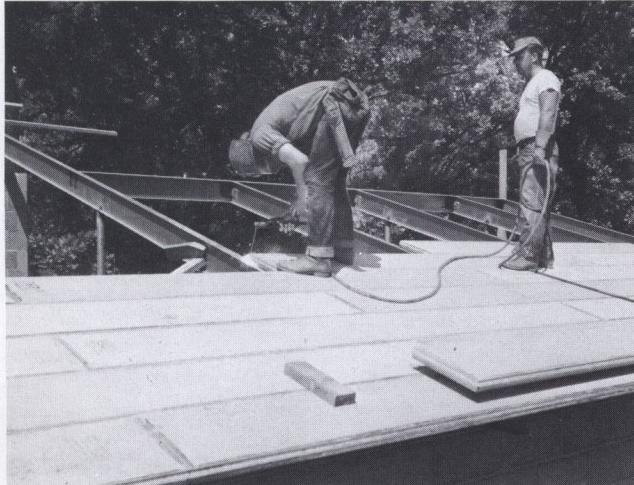
USG Metal Edge Gypsum Plank provides fast, low-cost construction—extra weather-resistant features

easy, all-weather assembly

This time-proved roof deck material goes up fast and easy—eliminates many costly winter construction delays. Units are laid without grout. Metal Edge Roof Planks are clip-attached or welded to supporting steel or are directly attached through the plank to wood or concrete joists. With the water-resistant feature of the plank there is no need to rush the finish roofing to prevent moisture damage.

smooth level surface

An economical nailing-type deck with good holding power is provided. Metal edges are rugged and not easily damaged. Planks offer an excellent surface for flat or shingle roofing.



welded attachment

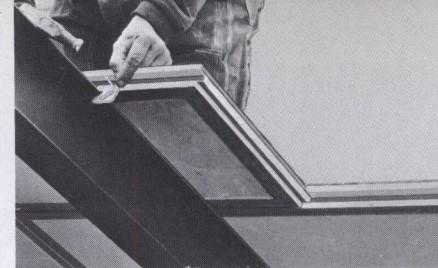
pitched & mansard roofs

Metal Edge Plank is ready to use on flat, pitched or mansard roofs. It can also be applied to curved or warped areas where the radius of the curve exceeds 150 ft. On steep-pitched roofs, welded application is recommended.

excellent lateral bracing and uplift resistance

USG Metal Edge Gypsum Plank provides excellent lateral uplift resistance when applied as recommended.

With standard clip attachment, wind uplift resistance is 470 lb. per clip. With welded attachment of plank on roof slopes up to 75°, $\frac{1}{8}'' \times \frac{3}{8}''$ fillet welds with 320 lb. shear per weld provide uplift resistance of 1,480 lb. per plank with supports spaced 3'0"; 635 lb. per plank with supports spaced 7'0" o.c.



clip attachment

I-beam action insures positive structural strength

The interlocking tongue-and-groove edges provide built-in I-beam action for superior strength and load distribution. Plank ends may occur off supports.

dependable

USG Metal Edge Gypsum Plank does a superior job at relatively low cost. United States Gypsum stands for integrity in design, consistent quality, and reliable service—qualities proved in more than 50 years of roof deck performance.

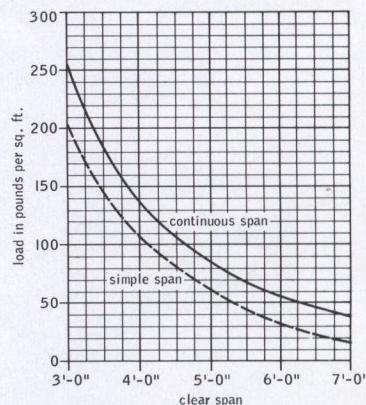
limitations

1. Gypsum plank roofs are practical for all buildings having normal humidity conditions and normal or moderately high temperature conditions. Where continuous high humidity or unusually high temperatures are expected, consult U.S.G.
2. Precautions should be taken to prevent thrust accumulations on steeply pitched roofs (see Specifications, page 4).
3. Maximum eave overhang based on 45-lb. total load is 3'2".

design properties

The graph below indicates the allowable uniformly distributed loads that can be superimposed on USG Metal Edge Gypsum Plank supported on various joist spacings. No load indicated on the graph will induce deflection greater than 1/240 of the span, nor exceed a design stress of 20,000 psi in the metal edging. Load-carrying capacities are shown for simple and continuous span conditions.

allowable uniform superimposed loads



Maximum allowable bending stress in metal edging is 20,000 psi. Values are based on simple and 2-span continuous bending moments at $\frac{wl^2}{8}$; three or more continuous spans bending moments at $\frac{wl^2}{10}$. Deflections are limited to 1/240 of the span and based on deflection constant as follows: 0.013 $\frac{wl^4}{EI}$ for simple spans, 0.0054 $\frac{wl^4}{EI}$ for 2 continuous spans and 0.0069 $\frac{wl^4}{EI}$ for three or more continuous spans. Contact your United States Gypsum representative for information on highly concentrated loads. For bar joists spaced 7'-0" o.c., the effective clear span is only 6'-8" between the bar joist flanges, and the allowable superimposed load for MEP-7 is found at 6'-8" on the above chart.

USG Metal Edge Gypsum Plank

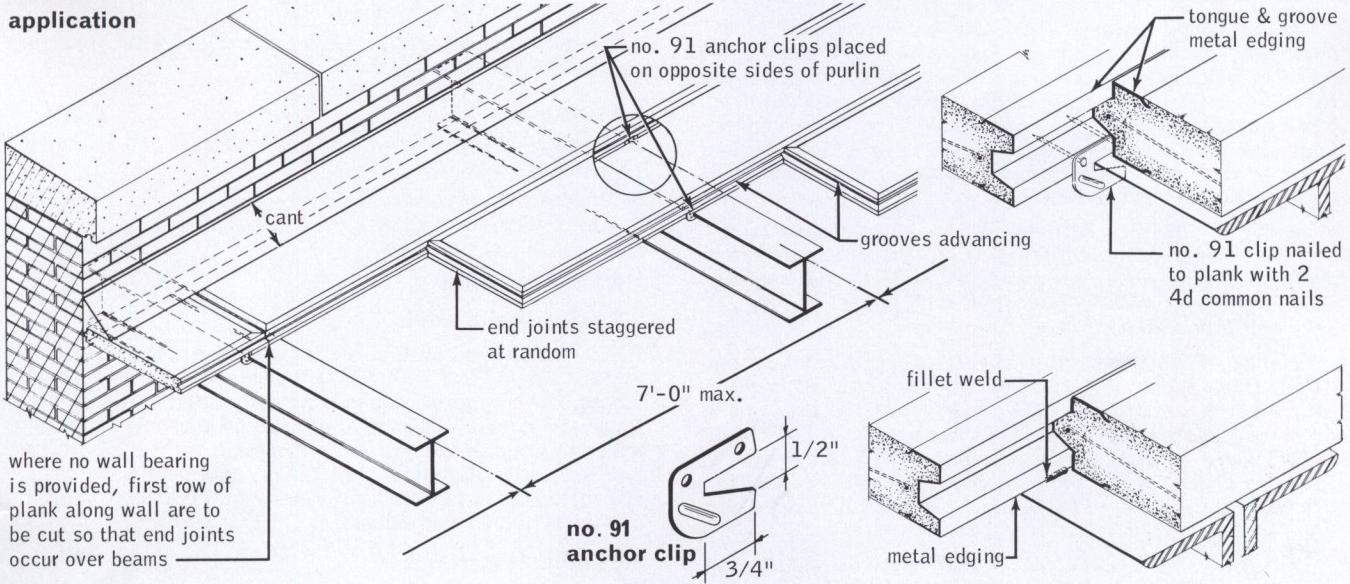
nail-holding power

type of roofing	description of nail	holding power dry plank— $1\frac{1}{2}$ " penetration
built-up, shingles and tile	6d cut cornice 2" 10-ga. galv. roofing nail	53 lbs.
	1 $\frac{1}{4}$ " SIMPLEX gypsum deck nail	74 lbs.
	1" SIMPLEX—TUBE-LOC nail	121 lbs.
	1 $\frac{1}{2}$ " ES—NAIL-TITE nail (1 $\frac{1}{4}$ " penetration)	199 lbs.
	2" 11-ga. galv. roofing nail (1 $\frac{1}{4}$ " penetration over $\frac{3}{4}$ " rigid roof insulation)	214 lbs.
		72 lbs.

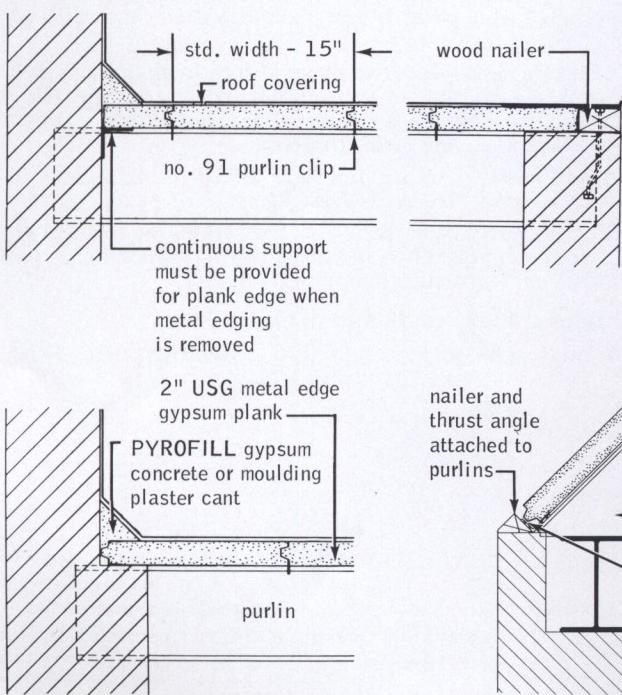
Tests conducted at U.S.G. Research Center

details

application

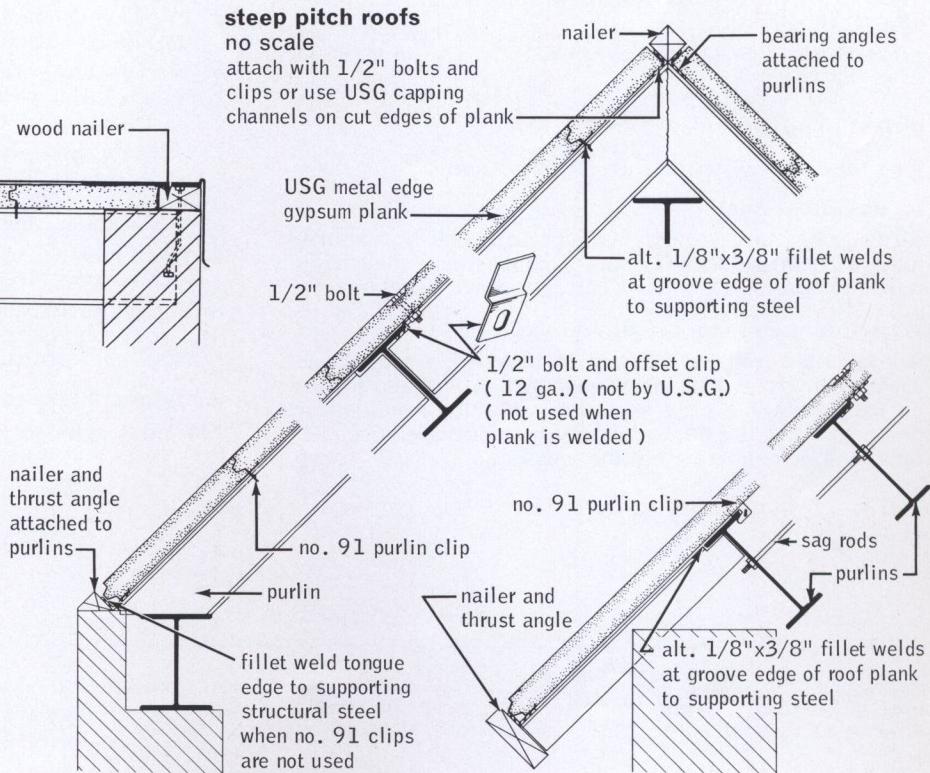


parapet & end walls

scale: $\frac{1}{4}$ " = 1'-0"

steep pitch roofs

no scale
attach with 1/2" bolts and clips or use USG capping channels on cut edges of plank



specifications

notes to architect

1. A $1\frac{1}{2}$ " continuous support should be provided for terminal plank rows or plank cut so ends occur over supports. On pitched roofs, plank should be continuously supported at eaves, hips, ridges and valleys (see details, page 3). Thrust angles are recommended for all pitches, but may be omitted on pitches less than 30° where structural masonry bearing is provided. Standard attachment satisfactorily resists thrust for pitches up to 30° . For greater pitches up to 75° , welded attachment or clip attachment with added $\frac{1}{2}$ " bolts and offset clips are recommended (see details).

2. Roofing should be applied as soon as possible after plank installation. For built-up roofing, shingles, slate and tile, a base sheet should be nailed dry using nails providing $1\frac{1}{4}$ " penetration into slab (see nailing data). If roofing is mopped on, take steps to prevent asphalt leakage through plank joints. For shingles, slates and tiles, square-cut nails providing $1\frac{1}{2}$ " penetration should be used. Metal edging may require punching for proper application of non-ferrous nails.

3. Venting of Enclosed Spaces—All enclosed spaces beneath roof decks should have outside venting. Such venting by small louvers or openings does not appreciably affect attic temperatures. Please refer to the current ASHRAE Guide (Chapter 21) for complete information.

4. Painting—Plank must be dry, with edging free of grease and oil. Prime edging with METAL COAT Zinc Dust Primer; seal gypsum with SHEETROCK Sealer; allow to dry. Apply one or two coats GRAND PRIZE latex, PRO-KYD alkyd, or TAL Latex Wall Paint. If necessary to paint plank before gypsum is dry, prime edging as above and apply TEXOLITE Standard casein paint with $1\frac{1}{2}$ -oz. Dowicide "G" added per gal. of paste.

5. See separate U.S.G. Folders in this series for details and specifications on fire-rated AURATONE Ceiling Panels, SHEETROCK FIRECODE "C" Gypsum Panels and poured-in-place Gypsum Concrete Roof Decks.

The most expedient way to obtain details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages or bundles, handled and stored on edge and stocked off the ground in a place providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 protection

Temporary wood protection shall be placed over gypsum plank areas exposed to repetitive impact or wheeled loads.

Part 2: products

2.1 materials

- USG Metal Edge Gypsum Plank— $2'' \times 15'' \times 10'0''$, water-resistant core, with galvanized attachment clips, conforming to ASTM C377-66.
- Nails—(4d common or $1\frac{1}{2}''$ -11-ga. galvanized roofing nails—for attaching clips) (16d common nails—for attaching plank to wood framing).
- Fill—PYROFILL Gypsum Concrete or RED TOP Moulding Plaster—for ridges, hips and cants.

2.2 equipment

- Cutting—Power saw with Black & Decker 58025 abrasive blade or equal.
- Welding—Short arc, automatic wire-feed, MIG type welder using silicon-bronze wire shielded with argon gas.

Part 3: execution

3.1 plank installation

Begin installation at one corner of roof area; place plank with marked side up and with grooved edge forward. Install plank across roof supports with joints tightly fitted and end joints staggered at least $30''$ apart. Start and end alternate plank rows with full units or cut pieces long enough to bear on at least two supports. Remaining alternate rows may have planks bearing on one support. Place cut ends and edges over supports at roof perimeter and openings.

3.2 plank anchorage

Anchor planks to supports according to the following:

- Steel purlins**—Use galvanized metal clips attached with two 4d common nails per clip. Where span is $3'6''$ or less, use clip on alternate supports.
- Steel purlins**—Weld metal edging to each support with a $\frac{1}{8}'' \times \frac{3}{8}''$ fillet weld. Where span is $3'6''$ or less, weld to alternate supports.
- Concrete joists**—Fire two power-driven studs through each plank at each support with adequate penetration for secure attachment. Where steel plates are embedded in joists, weld metal edging as in (b) above.
- Wood joists**—Use two 16d nails driven through plank at each support. Set heads flush with top of plank.
- For pitches greater than 30° , use welded attachment or clip attachment plus additional $\frac{1}{2}$ " standard bolts and offset clips as detailed.

3.3 ridges, hips, cants and drainage fills

Fill joints at ridges and hips with gypsum concrete. Form cant strips and drainage fills in place.

fire rating	description	test no.	sound rating		comments
			STC	IIC	
2 hrs.	USG Floor Plank System—(1) $\frac{1}{8}$ " vinyl flr tile (2) 39-oz carpet & 40-oz pad—2" USG gypsum flr plank welded to bar joists 48" o.c.—skim-coat MASTICAL underlayment or DURABOND 90 compd over plank joints—USG met fur chan 24" o.c. wire-tied to joists— $\frac{3}{8}$ " SHEETROCK FIRECODE "C" gypsum panels screw-att 12" o.c.—joints fin	UL Des G516 (was 266-2 hr)	(f)		
		(1) BBN-720317 (s) (1) BBN-720316 (s) (2) BBN-720314 (s)	51	32 61	
2 hrs.	USG Floor Plank System— $\frac{3}{4}$ " MASTICAL underlayment compd—(1) $\frac{1}{8}$ " vinyl flr tile (2) 39-oz carpet & 40-oz pad—2" USG gypsum flr plank welded to bar joists 48" o.c.—USG met fur chan 24" o.c. wire-tied to joists— $\frac{3}{8}$ " SHEETROCK FIRECODE "C" gypsum panels screw-att 12" o.c.—joints fin	UL Des G516	(f)		Fire rating also applies with FLO-FILL underlayment compd; sound ratings are comparable
		(1) BBN-720506 (s) (1) BBN-720507 (s) (2) BBN-720509 (s)	54	37 64	
2 hrs.	USG Floor Plank System— $\frac{3}{4}$ " MASTICAL underlayment compd—2" USG gypsum flr plank welded to bar joists 48" o.c.— $\frac{3}{8}$ " AURATONE FIRECODE ceiling panels on fire-rated exp grid	UL Des G230 (was 293-2 hr)	(f)		Fire rating also applies with FLO-FILL underlayment compd or with skim coat of compd over plank joints
		USG-700612	(s)	49	

description

USG Floor Plank Systems are lightweight, noncombustible assemblies that are laid dry without grout. Metal T&G plank edges are welded to the joists. The surface is suitable for direct application of carpet and pad, ceramic tile (in mortar bed) or wood parquet. A furred drywall or suspended ceiling is installed beneath the joists to complete the assembly.

USG Floor Plank for these systems is a precast metal-edged all-weather structural unit, 2" thick, 15" wide, 10 ft. long, weighing 13 psf; the moisture-resistant gypsum core is reinforced with 16-ga. galvanized wire mesh.

When finish flooring will be vinyl tile, a $\frac{3}{4}$ " fill of MASTICAL Underlayment Compound with $\frac{1}{16}$ " coat of USG Underlayment Topping Compound, $\frac{3}{4}$ " FLO-FILL Underlayment Compound or $\frac{3}{4}$ " PYROROCK Sound Underlayment Board with joints flushed is recommended.

MASTICAL, a super-strength gypsum underlayment compound, is mixed with water and sand; sets quickly to provide a durable, non-shrinking floor underlayment without curing. FLO-FILL, a super-strength gypsum cement with similar properties to MASTICAL, is non-aggregated and self-leveling to permit fast, pumpable application. PYROROCK Sound Underlayment Board, a specially formulated square-edge gypsum board, is screw-attached to plank edges for completely dry floor construction. The use of underlayment significantly increases sound attenuation performance; $\frac{1}{4}$ " plywood or hardboard may also be used as underlayment for tile.

function and utility

These systems, offering dry construction and an immediate working platform, are particularly suited to high-rise or garden apartments, dormitories and light office buildings where bar joists are used in steel frame or load-bearing masonry construction. They may also be used with raised floor systems where pedestals are centered over bar joists and unit load transmitted to plank is less than 220 psi. Pipe and conduits are readily carried in the bar joist space.

Fire Resistance—Noncombustible components provide a 2-hr. fire-resistance rating (see table above).

Sound Control—Above-average resistance to transmission of airborne and impact sound is provided without special underlayment. For maximum sound ratings, the use of underlayment compound or board (above) is recommended.

High Strength—USG Floor Planks support normal apartment floor loads on joist spacings up to 4 ft. o.c. and a 2,000-lb. concentrated load applied over a 2'6" square area on joists spaced

2'6". Interlocking T&G edgings of galvanized steel function as built-in "I" beams to produce superior strength and load distribution. Certified full-scale load tests show that effective resistance to lateral loads is provided for wind bracing and seismic design. The assemblies also resist wind uplift forces.

Lightweight—USG Floor Plank weighs 13.0 psf which allows for substantial economy in structural steel. Optional $\frac{3}{4}$ " PYROROCK Board adds only 3.5 psf, FLO-FILL Underlayment 5.0 psf and MASTICAL Underlayment 7.5 psf.

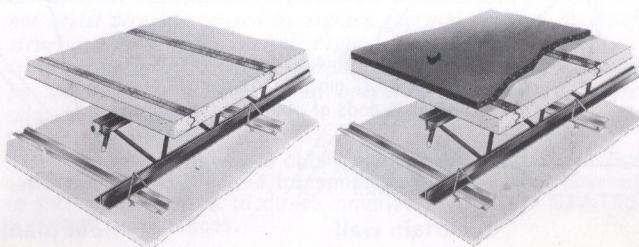
Fast Erection—Planks are laid dry; no grouting or curing required. Large T&G edges on plank fit together easily. Planks are quickly welded in place with lightweight short-arc welding equipment.

Economy—Simple, fast, all-weather erection; a minimum waste for cutting (less than 2%), and an opportunity for 48" bar joist spacing result in an economical assembly. Plank ends may occur off supports, greatly simplifying and speeding erection. This same system can be used as the roof decking system providing continuity of construction without involving added trades.

limitations

1. Maximum bar joist spacing: 4 ft. o.c. See table, page 2 for maximum allowable loads.
2. Not recommended for areas subject to sustained excessive humidity conditions.
3. Minimum U.S.G. Underlayment thickness: $\frac{3}{4}$ ".
4. Suitable for use with lightweight drywall or plaster par-

(continued on page 2)



USG Floor Plank
basic system

USG Floor Plank
with underlayment

design data/details

limitations (continued from page 1)

titions only. Partitions weighing more than 85 lbs./lin. ft. may require additional structural support.

5. Recommendations concerning environmental conditions must be adhered to for satisfactory performance (see Specifications, page 4).

6. Where heavy construction equipment, such as masonry buggies, is to be used, floor plank must be effectively protected with temporary planking.

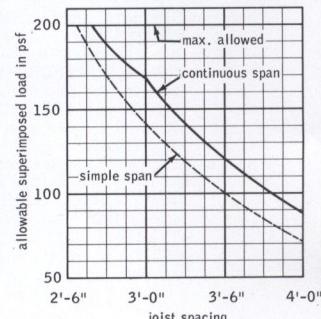
7. A suitable underlayment is required under resilient tile flooring.

design data

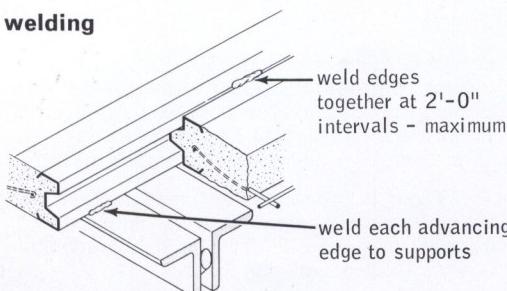
Diaphragm Construction—USG Floor Plank Systems function as structural diaphragm assemblies for resisting lateral forces. The ultimate diaphragm shear resistance (determined by certified test reports available on request) is 832 lbs. per ft. of shear width; the tested assembly consisting of USG Planks

2"x15"x10'-0" supported and welded 48" o.c. on steel bar joists, to each other and to perimeter structural-steel shear-transfer elements in accordance with welding details below.

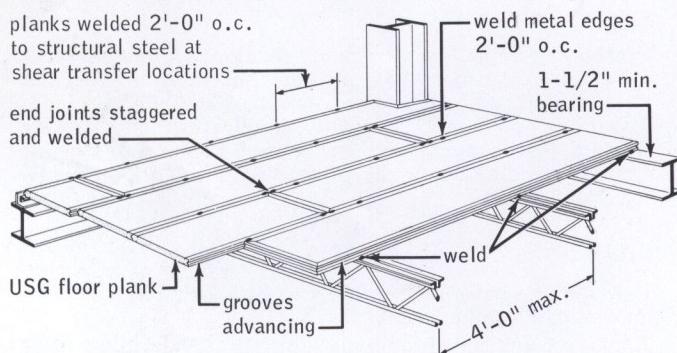
Superimposed Loads—Graph at right indicates the allowable uniformly distributed load that can be superimposed on USG Floor Plank supported on various joist spacings. None of the loads indicated will produce a deflection greater than 1/360 of the span or induce flexural stresses greater than 20,000 psi in the metal edging. Load-carrying capacities are shown for simple and continuous-span conditions.



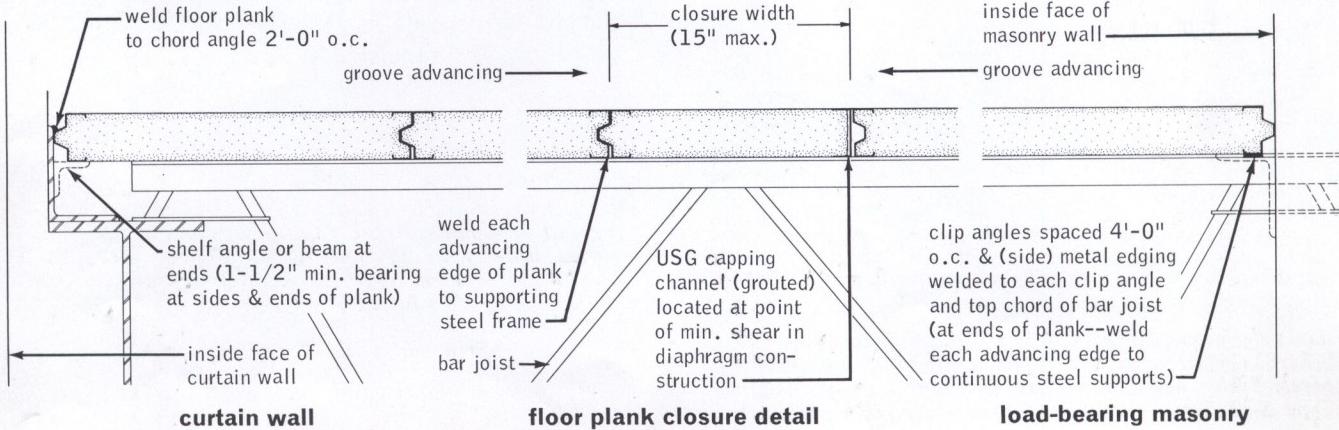
welding



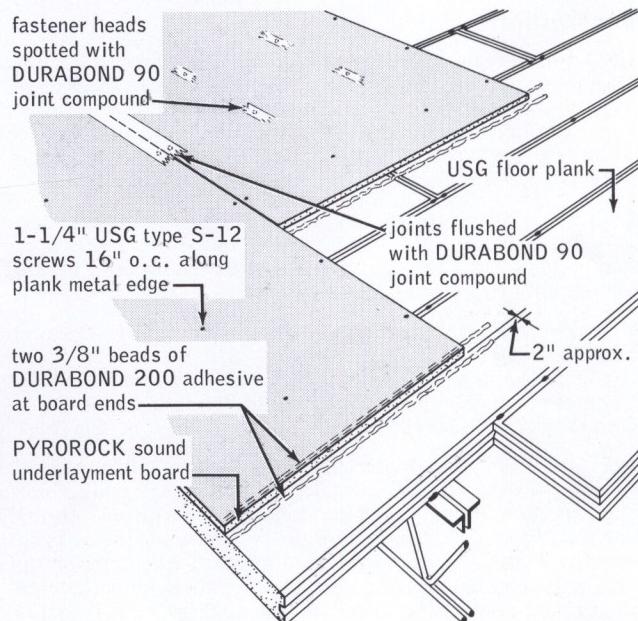
subfloor layout welded from above



framing at exterior walls

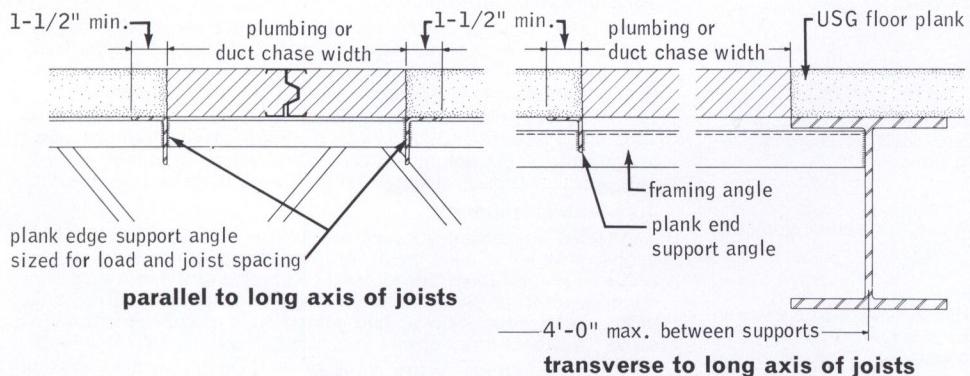


underlayment board application

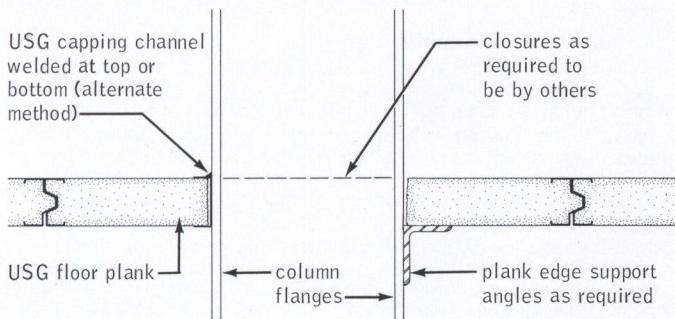


details

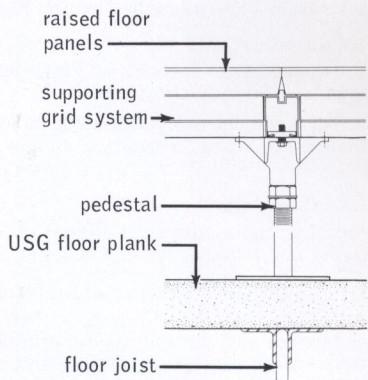
deck framing at openings



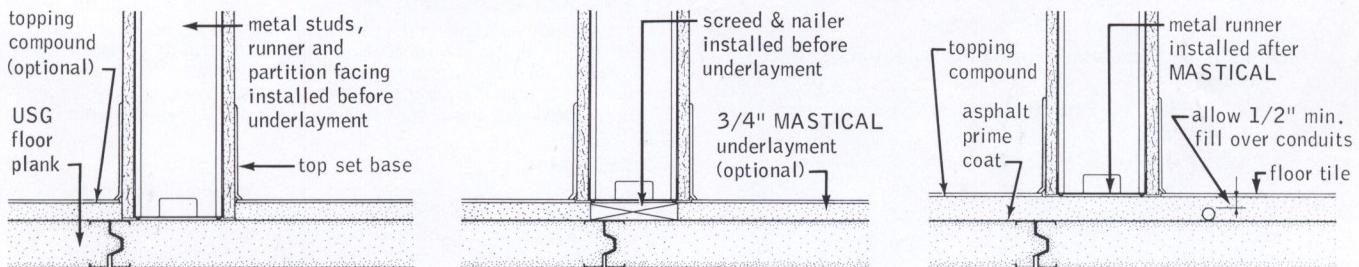
framing at columns



typical raised floor system



metal-stud partition attachments over underlayment compound



specifications

notes to architect

1. All supports should provide a smooth, level bearing surface, free of burrs, bridging, welds or other irregularities. At floor perimeter and openings, provide $1\frac{1}{2}$ " min. continuous bearing for plank support or USG Capping Channel, grouted in place and anchored to framing. At column interruptions where cantilever exceeds 18", install capping channel grouted and anchored to column; otherwise no support is needed.
2. For shear transfer from floor to framing, perimeter plank should be welded to the structure 24" o.c. along edges and 15" o.c. at ends.
3. Door frame anchors, partition plates and metal runners should be fastened directly to metal edges of floor plank or to $\frac{3}{4}'' \times 15'' \times 26\text{-ga.}$ galvanized steel strips screw-attached to metal edges. Secure metal strips and runners with $\frac{3}{8}''$ USG Brand Type S-12 Screws; 2x4 wood plates with $2\frac{1}{4}''$ USG Brand

Type S Screws. Power-driven concrete fasteners are not recommended. Runners should be fastened atop MASTICAL Underlayment Compound with expansion screw anchors or $1\frac{3}{4}$ " square-cut masonry nails; door frame anchors, with expansion screw anchors.

4. Holes cut in planks for electrical conduit, plumbing, etc. should be reinforced and filled upon completion of work.

5. MASTICAL and FLO-FILL Underlayment Compounds cannot resist stresses caused by sudden thermal changes or other structural movements such as occur when building temperature is raised suddenly. For this reason, building temperature should be stabilized near the normal operating temperature before underlayment application.

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general**1.1 scope—Specify to meet project requirements.****1.2 qualifications**

a. Installation of USG Floor Plank Systems shall be by a U.S.G.-approved flooring contractor.

b. All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 submittals

Flooring contractor shall submit shop drawings showing plank layout and schedule for stocking various floors.

1.4 delivery and storage of materials

All materials shall be delivered in their original unopened packages or bundles and stocked off the ground in a place providing protection from damage and exposure to the elements. Plank shall be handled and stored on edge. Damaged or deteriorated materials shall be removed from the premises.

1.5 environmental conditions

Building interior shall be enclosed and maintained at a uniform temperature above 55°F. until structure and subfloor temperatures are stabilized, before and during installation of (underlayment compound and topping) (flooring material). (Underlayment compound and topping shall be protected from rapid drying prior to set. After set, continuous heat and ventilation shall be provided to rapidly remove moisture from the area until slab is dry.)

1.6 protection

Temporary wood protection shall be placed over exposed floor plank (and underlayment) subject to concentrated or wheeled loads and heavy foot traffic.

Part 2: products**2.1 materials**

- a. USG Floor Plank—2" thick, 15" wide, 10'-0" long with 22-ga. galv. metal edges.
- b. USG Capping Channels—2", 22-ga., 10' long.
- c. Underlayment Compound—(MASTICAL) (FLO-FILL).
- d. USG Underlayment Topping Compound.
- e. PYROROCK Sound Underlayment Board, square edge, 3/4" x 48", (6') (8') lengths.
- f. RED TOP Wood Fiber Plaster (for repairs and grouting USG Capping Channels).
- g. Sand—ASTM C33 (obtain locally).
- h. Primer—Asphalt emulsion (obtain locally).
- i. DURABOND 90 Joint Compound.
- j. DURABOND 200 Adhesive.
- k. 1 1/4" USG Brand Type S-12 Screws.

2.2 mixes

- a. Underlayment Compound—100 lbs. MASTICAL: 3 cu. ft. sand: 6 1/2 to 7 1/2 gals. water; 80 lbs. FLO-FILL: 4 3/4 to 5 1/4 gals. water.
- b. Topping—25 lbs. topping compound: 5 to 5 1/2 qts. water.
- c. Primer—1 part asphalt emulsion: 1 part water (by volume).

2.3 equipment

- a. Cutting—Power saw with Black & Decker 58025 abrasive blade or equal.
- b. Welding—Short arc, automatic wire-feed, MIG type welder using silicon-bronze wire shielded with argon gas.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, MASTICAL, SHEETROCK, FIRECODE, AURATONE, RED TOP, FLO-FILL, PYROROCK, DURABOND.

Part 3: execution**3.1 plank installation**

Begin installation at one corner of floor; place plank with marked side up and with grooved edge forward. Install plank across joists with joints tightly fitted. Stagger end joints at least 30" apart and position at least two rows apart within the same joist space.

Each full-length or shortened plank must bear on at least two supports. Place cut ends and edges over supports at floor perimeter and openings. At column interruptions where cantilever exceeds 18", install capping channel grouted and anchored to column.

3.2 plank attachment

a. **Welded attachment**—Secure plank to each support at forward groove with a 3/16" fillet weld, 5/8" long. Weld top of plank where required around large cut-outs and columns. For diaphragm design connect abutting planks with 5/8" long welds spaced 2' o.c. max. along metal edges and at end joints; weld perimeter planks to shear transfer connections 24" o.c. along edges and 15" o.c. at ends.

b. **Clip attachment**—Secure plank to each support using #91 clips furnished and alternating clip direction where possible. Nail clips to plank with two 4d nails. Weld top of planks together for rigidity around large cut-outs and columns.

c. **Nail attachment**—Secure plank to wood supports with two 16d nails driven through plank at each support. Set heads flush with top of plank.

3.3 underlayment application

Repair voids, openings and damaged plank with plaster, leaving deck sound and smooth. Sweep deck clean and apply asphalt emulsion prime coat working it thoroughly into the surface.

Allow to dry one to two hours but not longer than 24 hours before underlayment application. If dry primed area does not possess a sufficient degree of water repellency, apply a second prime coat. Spread and screed underlayment to required thickness and finish to a smooth surface.

Install PYROROCK Sound Underlayment Board with long dimension across floor planks. Center end joints between plank edges and stagger in adjacent rows. Bond each end joint to plank with a 3/8" bead of DURABOND Adhesive. Attach board to metal plank edging at each plank joint with four screws placed at each edge and 16" o.c. in field of board. Flush joints and fastener heads smooth with DURABOND 90 Joint Compound. Sand if necessary before flooring application.

3.4 topping application

Apply topping after underlayment has set, darkened to final color and taken up surface moisture. Wet down area if underlayment surface is absorbent; remove any standing water. Pre-fill all voids, relief joints and depressions. Scratch in thin coat of topping and double back to min. 1 1/16" thickness. Trowel smooth; use water sparingly.

Fill large openings, such as around columns, with RED TOP Wood Fiber Plaster mixed to thick slurry. Reinforce with diamond mesh lath, place forms on underside, and pour slurry. Screed and trowel to smooth surface.

3.5 patching

Repair voids, holes, damage and other surface deformities with USG Underlayment Topping Compound mixed 25 lbs. to 5 or 5 1/2 qts. water. Clean and pre-moisten surface, pre-fill, then scratch-in thin coat and double-back to min. 1 1/16" thickness. Trowel smooth; use water sparingly.

Sweep deck clean and apply DURABOND 90 Joint Compound over all metal floor plank edges. Screed compound flush with adjacent core surfaces and finish to a smooth surface.

3.6 skim coating

At the completion of work, (clean all excess underlayment compound from adjacent walls or framing) remove all excess materials, tools, equipment and rubbish from the building and job site. Leave floors broom clean.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

description and utility

GRATE-X is a heavy-duty expanded metal, produced from carbon steel sheet and plate. GRATE-X contains no joints or welds; each sheet is a single piece of sturdy steel.

Structurally stronger than the original sheet, yet lightweight, GRATE-X Expanded Metal Grating is the ideal walkway and platform floor for light to heavy pedestrian loads. The Selection Guide on page 2 indicates the load/span combinations that may be accommodated with less than $\frac{1}{4}$ " deflection considered the maximum deflection to afford pedestrian comfort. U.S.G. test data confirms that greater loads may be safely accommodated if the amount of deflection is not critical.

Low Cost—A cost-conscious engineer is always wary of over-design. It is frequently more economical to build walkways and platforms with GRATE-X than with other types of steel grating. Savings of up to 50% are not unusual. The reduction in dead weight, afforded by the use of GRATE-X, is also a plus factor in the design of large structures.

Safety—Most companies place safety ahead of all other aspects of plant operation. For this reason the plant engineer or plant designer is always looking for ways to improve *safety performance* of an installation. GRATE-X provides an excellent *slip-resistant* walking surface; helps meet OSHA requirements. Safe, sure footing is especially important above ground level.

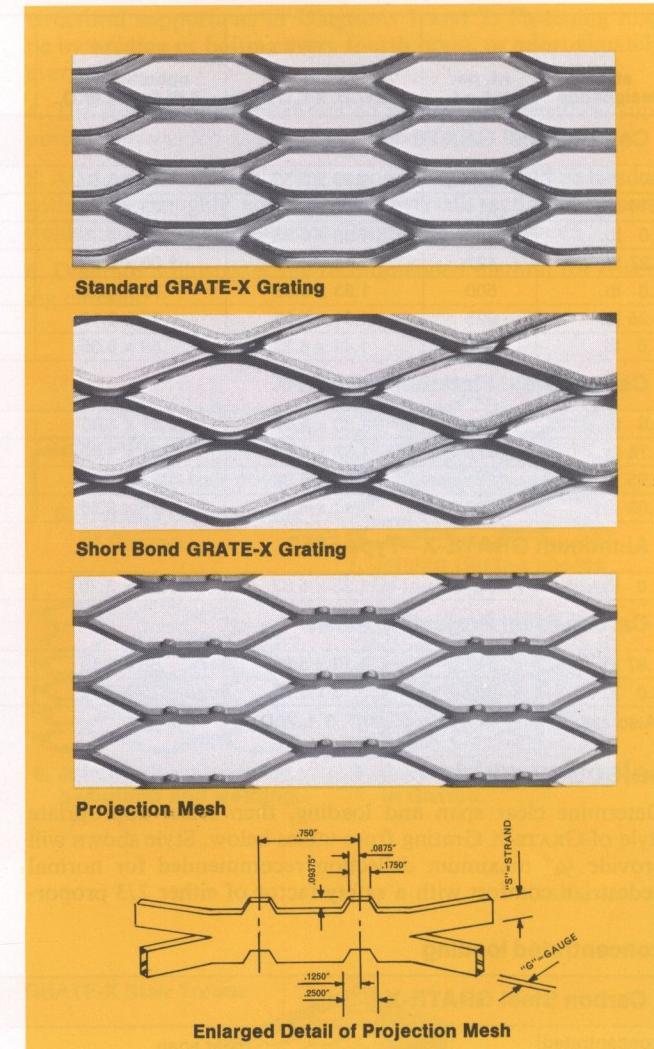
The high percent of open area, characteristic of GRATE-X, allows snow, water and oil to drain off easily, thus maintaining the slip-resistant surface. The open area also allows excellent passage of heat and light, and contributes to walkway cleanliness. Where maintenance and safety are important considerations, these features are outstanding.

Handling and Job Fabrication—Convenient sheet sizes and light weight make GRATE-X a favorite of steel workers. Job cutting and fitting is simply done by one or two men with standard cutting and welding equipment. The convenient sheet sizes make it possible to move GRATE-X into semi-finished structures for installation on walkways and platforms even though the roof of the structure has been completed.

Federal Specifications—GRATE-X meets all requirements of Military Specifications MIL-M-17194C (Metal, Expanded, Steel) and MIL-G-18015 (Ships) (Gratings, Metal, other than Bar Type), and the deflection requirements of Federal Specification RR-G-1602.



*Reg. U.S. Pat. & Tm. Off.



types and functions

1. Carbon Steel GRATE-X Grating is manufactured in two patterns: Standard GRATE-X available in 3.0, 4.0, 5.0, 6.25 and 7.0-lb. styles; Short Bond GRATE-X available in 3.14 and 4.27-lb. styles. Flattened GRATE-X is regular GRATE-X that has been cold-rolled to a smooth surface; available in four styles (see product data table).

2. Aluminum GRATE-X Grating is the same as Standard GRATE-X but is made from aluminum alloy 5052-H32. Available in 2.0-lb. style, it offers the combined advantages of aluminum and expanded metal grating. Specific advantages are:

Economy—Light weight and high strength per pound provide a highly economical open type metal flooring.

Corrosion Resistance—Offers excellent resistance to weathering and industrial atmospheres without painting.

Non-sparking, Non-magnetic, Non-toxic—Ideal for use in explosive atmospheres and food processing plants.

3. Carbon Steel Projection Mesh is a uniquely designed expanded metal with small tooth-like projections on the upper surface of the mesh. The projections provide an excellent non-slip surface. Available in 1.87 and 3.0-lb. styles suitable for light to moderate loads on spans of 6" to 24", it is excellent for industrial platforms, maintenance stands, and stair treads where maximum safety is required.

style designation	wt. per 100 s.f.	diamond size S.W.D. x L.W.D.	opening size S.W.O. x L.W.O.	strand size width x thickness	depth (inches)	percent open area	standard size sheet	
							width (S.W.D.)	length (L.W.D.)
Carbon Steel GRATE-X								
3.0 lb.	300	1.33 x 5.33	.95 x 3.50	.264 x .183	1/16	60	4' & 6''	8', 10' & 12''
3.14 lb.	314	2.00 x 6.00	1.63 x 4.88	.312 x .250	11/16	69	4' & 6''	10''
4.0 lb.	400	1.33 x 5.33	.83 x 3.30	.300 x .215	5/8	62	4', 5' & 6''	8' & 10''
4.27 lb.	427	1.41 x 4.00	1.00 x 2.88	.300 x .250	5/8	58	4' & 6'/4"	8'/10''
5.0 lb.	500	1.33 x 5.33	.76 x 3.20	.331 x .250	11/16	57	4' & 5''	8' & 10''
6.25 lb.	625	1.41 x 5.33	.75 x 3.10	.350 x .312	3/4	53	4' & 6'/6'	8'/6'3"
7.0 lb.	700	1.41 x 5.33	.69 x 3.05	.391 x .312	3/4	49	4'/6'	8'/6'3"

Carbon Steel Flattened GRATE-X

2.8 lb.	280	1.33 x 5.67	.81 x 4.00	.285 x .160	.160	55	4'	8'
3.75 lb.	375	1.33 x 5.67	.81 x 4.00	.320 x .190	.190	50	4'	8'
2.95 lb.	295	2.00 x 6.38	1.31 x 5.50	.340 x .220	.220	64	4'	10'
4.02 lb.	402	1.41 x 4.25	.75 x 3.50	.315 x .210	.210	53	4'	8'

Aluminum GRATE-X—Type 5052

2.0 lb.	200	1.33 x 5.33	.61 x 3.20	.387 x .250	3/4	46	4'5'	8'10'
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Carbon Steel Projection Mesh

1.87 lb.	187	1.13 x 5.00	.88 x 3.19	.187 x .134	1/16	67	6'/4'	10'8"4"
3.0 lb.	300	1.13 x 5.00	.75 x 3.12	.250 x .164	5/8	56	6'	8"4"

*Also available 10' S.W.D. x 2', 2'6", 3' L.W.D.

selection guide

Determine clear span and loading, then select appropriate style of GRATE-X Grating from tables below. Style shown will provide 1/4" maximum deflection recommended for normal pedestrian comfort with a safety factor of either 2/3 propor-

tional limit or 1/2 ultimate load, whichever is less. Data based on tests conducted by U.S.G. Research Center; see GRATE-X Grating catalog IS-15 for complete load/deflection data.

concentrated loading

Carbon Steel GRATE-X

concentrated load (lbs. per foot of width)	clear span									
	18"	24"	30"	36"	42"	48"	54"	60"	66"	72"
50	3.0 3.14	3.0 3.14	3.0 3.14	3.0 3.14	3.0 3.14	4.0 4.27	5.0 7.0	6.25 7.0	6.25 7.0	7.0
100	3.0 3.14	3.0 3.14	3.0 3.14	3.0 3.14	4.0 4.27	5.0 6.25	7.0 7.0			
150	3.0 3.14	3.0 3.14	3.0 3.14	5.0 6.25	5.0 6.25	7.0 7.0				
200	3.0 3.14	3.0 3.14	4.0 4.27	5.0 6.25	6.25 7.0	7.0 7.0				
250	3.0 3.14	3.0 3.14	4.0 4.27	6.25 7.0	7.0 7.0					
300	3.0 3.14	4.0 4.27	5.0 6.25	7.0 7.0						
350	3.0 3.14	4.0 4.27	6.25 7.0	7.0 7.0						
400	3.0 3.14	4.0 4.27	6.25 7.0							

Aluminum GRATE-X

concentrated load (lbs. per foot of width)	clear span					
	12"	18"	24"	30"	36"	
50	2.0	2.0	2.0	2.0	2.0	
100	2.0	2.0	2.0	2.0	2.0	
150	2.0	2.0	2.0	2.0		
200	2.0	2.0	2.0			

Carbon Steel Projection Mesh

50	1.87	1.87	1.87	3.0	3.0	
100	1.87	1.87	3.0	3.0		
150	1.87	1.87	3.0			
200	1.87	3.0				

uniform loading

Carbon Steel GRATE-X

uniform load (lbs. per sq. ft.)	clear span					
	24"	30"	36"	42"	48"	
50	3.0 3.14	3.0 3.14	3.0 3.14	4.0 5.0	6.25 7.0	
100	3.0 3.14	3.0 3.14	5.0 6.25			
150	3.0 3.14	4.0 5.0	6.25 7.0			
200	3.0 3.14	5.0 6.25				
250	3.0 3.14	6.25 7.0				
300	4.0 4.27	6.25 7.0				
350	5.0	7.0				
400	5.0					

Aluminum GRATE-X

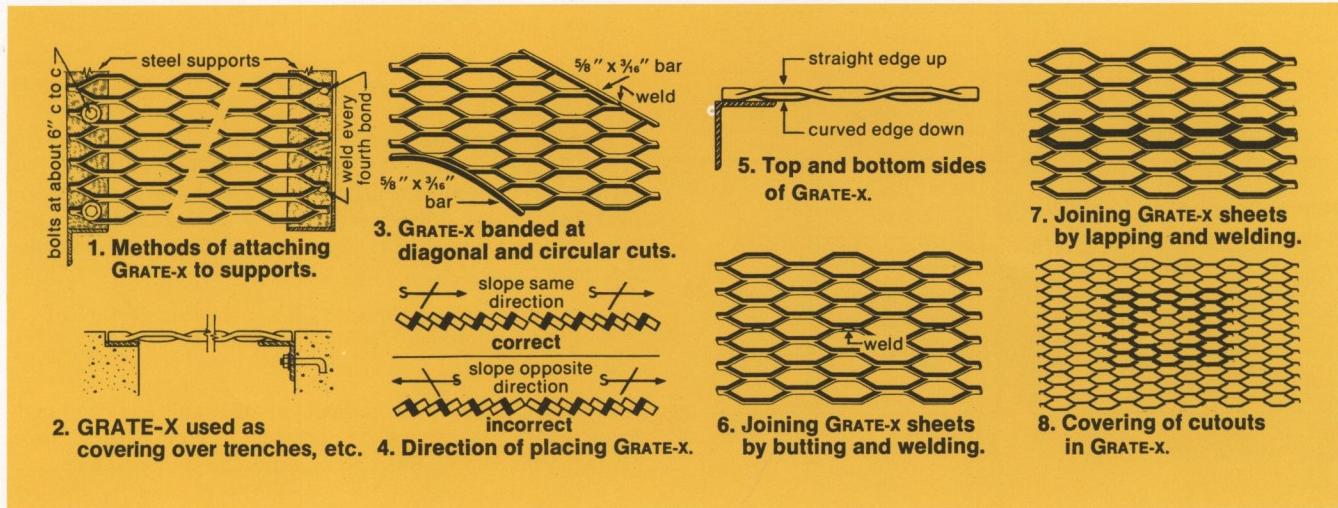
uniform load (lbs. per sq. ft.)	clear span				
	12"	18"	24"	30"	36"
50	2.0	2.0	2.0	2.0	2.0
100	2.0	2.0	2.0	2.0	2.0
150	2.0	2.0	2.0		
200	2.0	2.0	2.0		

Carbon Steel Projection Mesh

50	1.87	1.87	1.87	3.0		
100	1.87	1.87	1.87	3.0		
150	1.87	1.87	3.0			
200	1.87	1.87	3.0			

installation recommendations

1. GRATE-X has a "top" and "bottom" side, as shown in Diagram 5, below. GRATE-X should be installed with the straight edge up for greater surface contact.
2. The slope of the bonds (see Diagram 4) should always be in the same direction on a given platform or walkway for neatness and uniformity.
3. GRATE-X should always be placed so that the long direction of the diamond openings is perpendicular to structural supports, and the ends should always bear on, and be fastened to,



U.S.G. project fabrication service

For installations where stock size sheets cannot be used, United States Gypsum estimates, quotes, details and fabricates to your requirements; supplies GRATE-X Grating with banding and toe plates installed where needed; applies rust-preventive primer or furnishes hot-dip galvanizing on request... welds tags to every section of GRATE-X for easy identification to prevent errors. This service is available through your U.S.G. distributor.

stair treads

Fabricated from GRATE-X and simple steel sections, U.S.G. Stair Treads are strong, durable, and provide a safe, sure footing. Like GRATE-X, they are self-cleaning and easily maintained. Ideal for industrial stairs, either interior or exterior; quickly installed by simple attachment with bolts and nuts to standard channel stringers. Shipped completely fabricated, primed and ready to install. Attachment bolts not furnished.

Stair treads are available in popular sizes or produced to order in $\frac{1}{2}$ " length increments up to and including 48". Manufactured in two types:

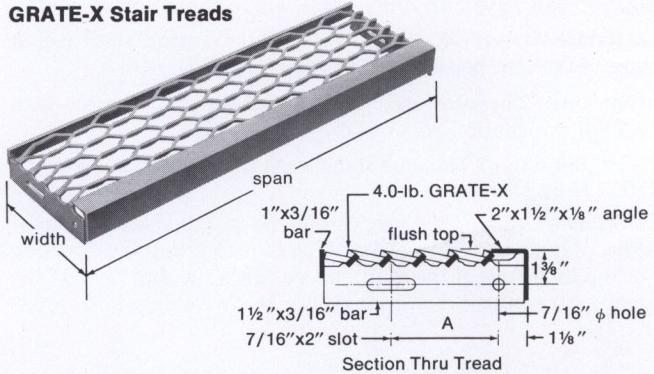
GRATE-X Stair Treads—sturdy welded assembly available with abrasive or checkerplate nosing on special order. Sizes available on order: $8\frac{1}{4}'' \times 24''$, $8\frac{1}{4}'' \times 30''$, $9\frac{5}{8}'' \times 30''$, $9\frac{5}{8}'' \times 36''$.

TREAD-X Stair Treads—unique design provides economically priced tread. Sizes available on order: $8\frac{1}{2}'' \times 24''$, $8\frac{1}{2}'' \times 30''$, $9\frac{3}{4}'' \times 30''$, $9\frac{3}{4}'' \times 36''$. Also available with serrated front bar.

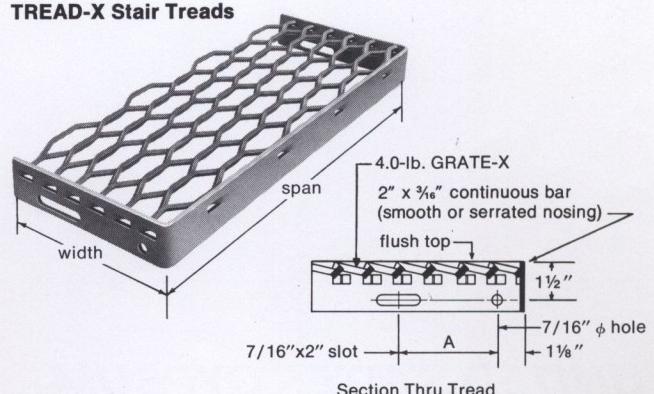
structural supports as in Diagrams 1 and 2. Fastening may be by welding or bolting every fourth bond, or approximately every 6".

4. The sides of adjacent sheets do not require structural supports when welded as in Diagrams 6 and 7.
5. All diagonal or circular cut exposed edges should be banded with a bar roughly equal to the over-all grating thickness, welded at contact points. See Diagram 3.
6. Diagram 8 illustrates the recommended method for covering cutouts.

GRATE-X Stair Treads



TREAD-X Stair Treads



stair tread product data

width	dimension "A"	weight in lbs.	
		base	per 1"
GRATE-X tread			
5½"	2½"	.90	.32
7"	2½"	1.12	.36
8¼"	4½"	1.30	.38
9¾"	6"	1.53	.42
11"	7"	1.75	.46
TREAD-X tread			
5¾"	3"	1.11	.26
7⅓"	3"	1.39	.30
8½"	5¾"	1.60	.33
9¾"	5¾"	1.90	.37
11¼"	8"	2.15	.41

safe concentrated loads⁽¹⁾—lbs.

length	GRATE-X tread	TREAD-X tread
24"	780	600
30"	625	480
36"	520	400
42"	445	340
48"	390	300

(1) Load limits are approximately the same for treads of the same length, regardless of width.

specifications

scope—GRATE-X Expanded Metal Grating shall be installed for all walkways and other areas where shown on drawings.

material—GRATE-X Expanded Metal Grating shall weigh (specify weight per sq. ft. from table, page 2).

(For steel) The steel used in manufacture shall comply with ASTM designation A283-58T.

(For aluminum) The aluminum used in manufacture shall be 5052 H-32 alloy.

erection—Units of GRATE-X shall be installed with straight edge of bond up. GRATE-X shall be so placed that the direction of the long way of the diamond parallels the direction of the span. Attachment to framing shall be by welding at 6" inter-

vals. Edges parallel to long way of diamonds shall be butted and welded on every second bond. Individual pieces of GRATE-X shall be placed in such a manner that the diamonds of one piece are aligned with those of adjacent pieces.

ordering information

1. Order from your local U.S.G. Expanded Metal Distributor.

2. Always specify the amount, style and sheet size, as in the following examples:

20 pcs., 5.0# GRATE-X, 4' x 8'

5 pcs., 2.0# Alum. GRATE-X, 5' x 10'

Note: The sheet size S.W.D. (short way of diamond) is always specified and the sheet size L.W.D. (long way of diamond) is specified second, i.e., S.W.D. x L.W.D.

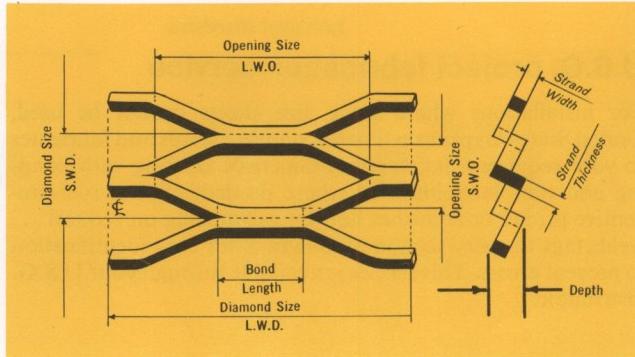
3. If special sheet sizes are required, state exact sheet size and type of shearing wanted, or dimensional tolerance allowed. GRATE-X is normally furnished bond-sheared on the first bond over the specified dimension (both S.W.D. and L.W.D.); however, it can be furnished random-sheared to a closer tolerance if required.

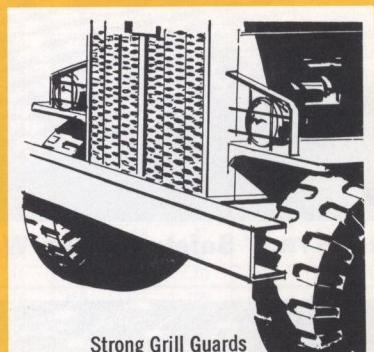
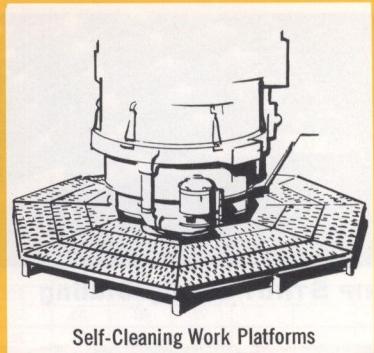
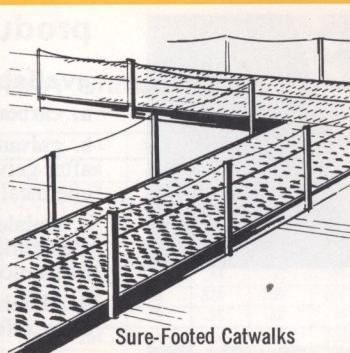
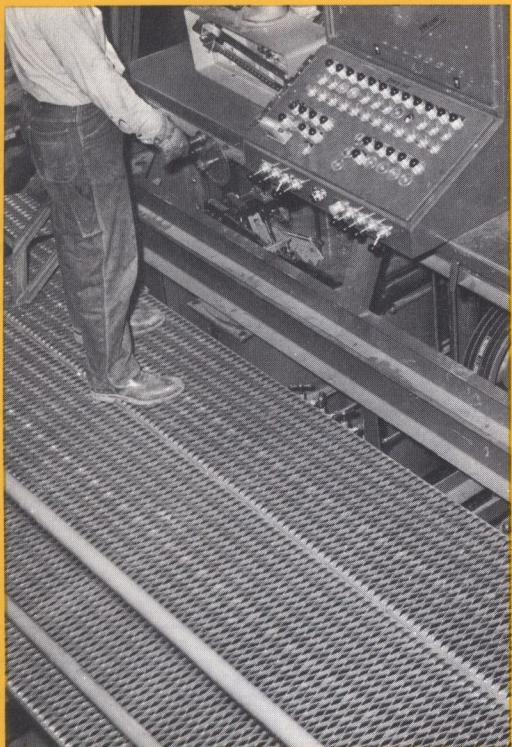
Standard tolerances on special sheet sizes are as follows:

Bond Sheared Sheets—0", +½ diamond

Random Sheared Sheets ± ½"

4. If your GRATE-X requirements involve walkways and platform areas that cannot be specified in simple sheet sizes, contact your U.S.G. Sales Representative for assistance.





description and utility

GRIP STRUT Safety Grating has been engineered to provide maximum safety underfoot, exceptional load-carrying capacity for intermediate span lengths, and lightweight, self-framing, one-piece construction. As such it helps meet OSHA standards for walking-working surfaces and is ideally suited for all types of work platforms, open flooring, catwalks, balconies, storage areas, walkways and stair treads. It has been extensively used by the aircraft, food processing, oil and automobile industries for these and other applications.

GRIP STRUT, a unique material, has reticulated and formed metal cross struts arranged in a diamond pattern with integrally formed channels at the edges. The cross struts form a slip-resistant, resilient walking surface with sufficient open area to provide ample passage of light and air. Other features:

High Strength—lightweight, one-piece construction develops strength from the section and a high load capacity per pound. Some styles are suitable for spans up to 12 ft.

Safety Surface—the unique surface pattern makes GRIP STRUT Safety Grating slip-resistant in all directions.

Easily Installed—most sections can be handled by one man. Cuts readily—is rapidly welded, bolted or clamped into place.

Large Open Area—permits free flow of air, heat and light. Often eliminates need for additional sprinklers under catwalks and platforms.

Economical—low in initial cost. Quickly installed, self-cleaning. Standard galvanized finish minimizes maintenance. Plain finish is easily painted for low maintenance costs. Light weight with high strength can result in structural steel savings.

types and functions

GRIP STRUT Gratings are manufactured in two basic types and in various channel depths and gauges to accommodate design loads needed for pedestrian traffic or those encountered in light storage or equipment installations (see safe load table). GRIP STRUT is produced in carbon steel, galvanized steel, aluminum and stainless steel in widths from 4 3/4 to 24 in. and lengths up to 14 ft. GRIP STRUT Grating products include:

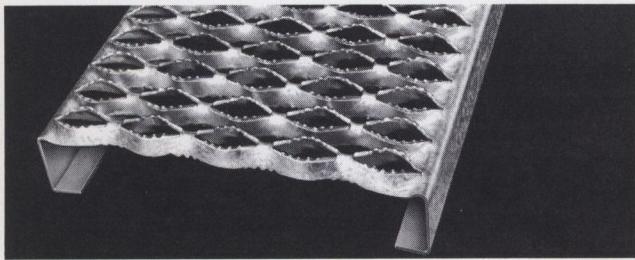
1. GRIP STRUT Safety Grating has a highly slip-resistant serrated surface for use where safety underfoot is a prime requirement. Material meets anti-slip values set forth in Fed. Spec. RR-G-1602. Classified by Underwriters Laboratories Inc. for slip resistance only; see UL Index of Classified Products.

2. GRIP STRUT Safety Grating Walkway, in 24-in. width with integral Z-flanges, meets OSHA requirements for toeboards on elevated runways. These 4 1/2-in. high flanges help prevent tools and parts from falling over the edges and make the grating ideal for conveyor walkways. This exceptionally strong walkway material is produced in two steel gauges: with spans up to 10 ft., concentrated pedestrian load capacity is 400 lbs. for 12-ga., 300 lbs. for 14-ga.

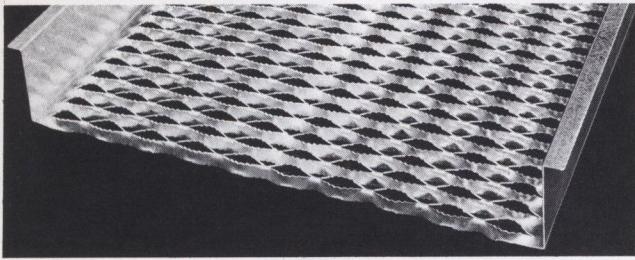
3. GRIP STRUT Non-serrated Grating provides a high-strength, lightweight pedestrian trafficway, platform or storage deck.

4. GRIP STRUT Safety Treads are ready-to-install units fabricated from GRIP STRUT Safety Grating. Standard Safety Stair Treads are available in 4 3/4, 7, 9 1/2 and 11 3/4-in. widths. Abrasive Nosing Safety Treads are available in 8 1/8 and 10 1/2-in. widths. Standard lengths: 24, 30, 36, and 48-in.; special lengths available on order.

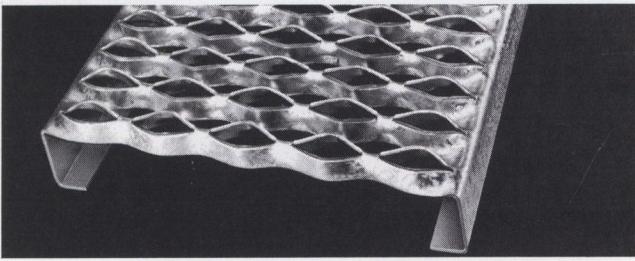
GRIP STRUT Stair Treads also are available fabricated from Non-serrated Grating.



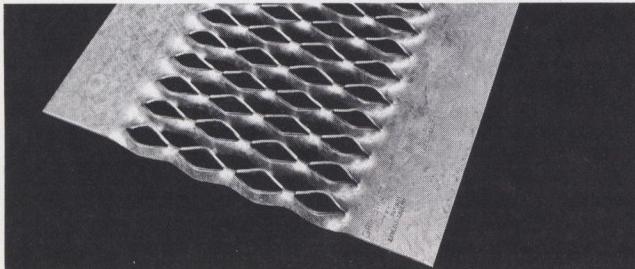
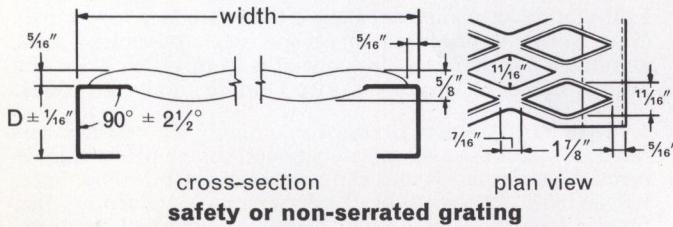
GRIP STRUT Safety Grating



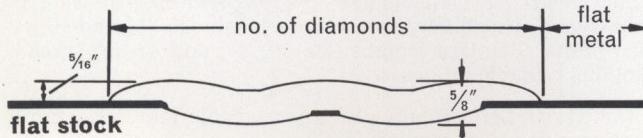
GRIP STRUT Safety Grating Walkway



GRIP STRUT Non-serrated Grating



GRIP STRUT Grating Flat Stock



product data

available metals

- carbon steel—hot rolled, pickled and oiled.
- galvanized steel—hot dipped mill-galvanized steel fabricated after galvanizing. In use the edges are protected by the electrochemical action of the zinc.
- stainless steel—alloy type 304, 18-8 (18 chrome, 8 nickel) austenitic stainless. This alloy offers excellent corrosion resistance, high strength and good weldability.
- aluminum—alloy 5052-0. In addition to light weight this alloy offers strength and corrosion resistance.

finishes

Standard: galvanized steel or plain steel painted with protective aluminum coating. Unpainted material is lightly oiled.

lengths—metal gratings

10 and 12 ft. in all materials and sizes.

grating—styles available

weights and dimensions

gauge & type	channel height (1) widths →	weight—lbs. per lin. ft.					
		4 3/4"	7"	9 1/2"	11 3/4"	18 3/4"	24"
14-ga. steel	1 1/2"	2.3	3.0	3.6	4.2	6.1	—
	2"	2.6	3.2	3.8	4.4	6.3	7.4
	2 1/2"	2.8	3.5	4.1	4.7	6.6	—
	3"	—	—	—	—	—	7.9
12-ga. steel	1 1/2"	3.2	4.1	5.0	5.9	8.5	—
	2"	3.6	4.5	5.4	6.2	8.9	10.4
	2 1/2"	4.0	4.9	5.7	6.6	9.2	—
	3"	—	5.2	6.1	7.0	9.6	11.1
12-ga. aluminum	2"	.94	1.15	1.38	1.59	—	—
16-ga. stls. stl.	2"	—	—	3.2	3.27	—	—

(1) Add $\frac{5}{16}$ " for overall depth

flat stock—styles available

Flat Stock is available in all standard materials and sizes. The open matrix is symmetrical about the flat plane. The following table indicates the approximate dimensions of flat metal available on each side.

dimensions—steel and aluminum

matrix	flat metal each side
2-diamond	2 1/4" to 3 13/16"
3-diamond	2 5/8" to 3 7/8"
4-diamond	2 3/8" to 3 3/8"
5-diamond	2 3/8" to 3 3/8"
8-diamond	2 5/8" to 4"
10-diamond	3 1/4" to 7 5/8"

Flat Stock also can be formed to suit requirements calling for specified dimensions of flat metal on either or both sides. Special side channels or special shapes can be formed on either or both sides.

stair tread—styles available

dimensions—steel and aluminum

standard				with abrasive nosing			
A	B	C	D	A	B	C	D
4 3/4" (2 dia.)	1 1/2"	3/4"	—	—	—	—	—
	2"	1"	—	—	—	—	—
7" (3 dia.)	1 1/2"	3/4"	3 3/8"	8 1/8"	1 1/2"	3/4"	4 1/2"
	2"	1"	3 3/8"	(3 dia.)	2"	1"	4 1/2"
9 1/2" (4 dia.)	1 1/2"	3/4"	5 7/8"	10 1/2"	1 1/2"	3/4"	6 7/8"
	2"	1"	5 7/8"	(4 dia.)	2"	1"	6 7/8"
11 3/4" (5 dia.)	1 1/2"	3/4"	8 7/8"	—	—	—	—
	2"	1"	8 7/8"	—	—	—	—

Length tolerance: $\pm \frac{1}{16}$ ". For key to dimensions, see drawings at right.

GRIP STRUT Safety Grating

design data

steel—GRIP STRUT Grating—5-diamond/11¾" width (1)

gauge	channel depth	span																	
		2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	
#14 ga.	1½"	U	536	344	240	177	136	108	88	74	62								
		D	.06	.10	.14	.20	.26	.33	.41	.50	.60								
		C	525	422	353	304	267	239	216	198	183								
		D	.05	.08	.12	.16	.21	.26	.33	.40	.48								
	2"	U	890	571	397	293	225	178	145	120	102	87	76	66	59	47			
		D	.06	.09	.13	.17	.23	.29	.36	.43	.52	.61	.71	.83	.95	1.21			
		C	707	699	584	502	440	393	355	324	299	277	259	243	230	207			
		D	.04	.07	.10	.14	.18	.23	.29	.35	.42	.49	.57	.66	.76	.97			
	2½"	U	1021	655	456	336	258	204	166	138	116	100	86	76	67	54	44		
		D	.04	.06	.08	.11	.14	.18	.23	.28	.33	.39	.45	.52	.60	.77	.96		
		C	707	707	669	575	505	450	407	371	342	317	296	278	262	236	216		
		D	.02	.04	.06	.09	.12	.15	.18	.22	.26	.31	.36	.42	.48	.62	.77		
#12 ga.	1½"	U	710	456	318	235	181	144	117	98	83	71	62	55	49				
		D	.07	.11	.15	.21	.28	.35	.44	.53	.64	.76	.89	1.03	1.18				
		C	695	558	467	402	354	317	287	263	244	227	213	201	190				
		D	.05	.08	.12	.17	.22	.28	.35	.43	.51	.60	.71	.82	.95				
	2"	U	1131	725	505	372	286	227	185	154	130	111	97	85	75	60	50	42	
		D	.05	.08	.11	.16	.20	.26	.32	.39	.47	.56	.65	.75	.86	1.11	1.39	1.70	
		C	1107	888	742	638	561	501	453	414	382	355	332	312	295	266	243	224	
		D	.04	.06	.09	.12	.16	.21	.26	.31	.38	.44	.52	.60	.69	.89	1.11	1.36	
	2½"	U	1691	1083	753	554	425	337	273	226	191	163	141	123	109	87	71	59	50
		D	.04	.06	.09	.13	.17	.21	.26	.32	.38	.45	.52	.60	.68	.87	1.09	1.33	1.60
		C	1115	1115	1106	950	833	742	669	610	561	519	484	453	426	382	347	319	295
		D	.02	.04	.07	.10	.13	.17	.21	.25	.30	.36	.41	.48	.55	.70	.87	1.06	1.28
	3"	U	2138	1370	952	701	537	425	345	286	241	206	178	155	137	109	89	74	63
		D	.04	.06	.08	.11	.14	.18	.22	.27	.32	.38	.44	.51	.58	.74	.93	1.13	1.36
		C	1115	1115	1115	1115	1052	937	845	770	707	654	609	570	537	480	436	399	369
		D	.02	.03	.05	.08	.11	.15	.18	.22	.26	.31	.36	.41	.47	.60	.74	.90	1.09

stainless steel—GRIP STRUT Grating—5-diamond/11¾" width (1)

material	channel depth	span																
		2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"
#16 ga. Type 304	2"	U	583	374	261	192	148	118	96	80	68	58						
		D	.05	.08	.11	.16	.20	.26	.32	.39	.47	.56						
		C	464	458	383	330	290	259	235	215	199	185						
		D	.03	.06	.09	.12	.16	.21	.26	.32	.38	.45						

(1) Approx. conversion factors for other sizes (uniform load only)
width 4¾" 7" 9½" 18¾" 24"
factor 2.53 1.71 1.26 0.64 0.49

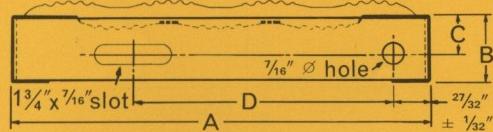
For load data on other sizes, see GRIP STRUT Grating Catalog G-60.

aluminum—GRIP STRUT Grating—5-diamond/11¾" width (1)

material	channel depth	span			
		1'-6"	2'-0"	2'-6"	3'-0"
.080	2"	490	276	177	123
Alloy 5052		.02	.04	.07	.09
		C	243	243	217
		D	.01	.03	.05

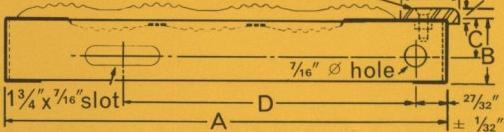
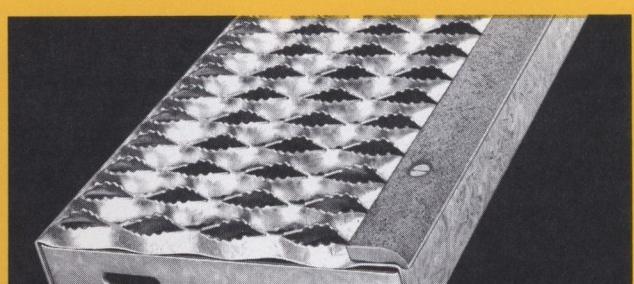
U—uniform load, lbs./sq. ft.; C—concentrated load, lbs.; D—deflection in inches.
The above safe loads were determined in accordance with A.I.S.I. Light Gauge Cold Formed Steel Design Manual 1962, Section 6.

GRIP STRUT Safety Stair Tread



dimensions A, B,
C, & D have a
tolerance $\pm \frac{1}{16}$ "

treads available
in safety edge
as shown, or in
intermediate type



safe loading—GRIP STRUT Stair Treads

U-uniform load C-concentrated load (pounds)		2-diamond						3-diamond						4-diamond						5-diamond					
material		steel		steel		alum.		steel		steel		alum.		steel		steel		alum.		steel		steel		alum.	
gauge		14		12		.080		14		12		.080		14		12		.080		14		12		.080	
span	side channel	C	U	C	U	C	U	C	U	C	U	C	U	C	U	C	U	C	U	C	U	C	U	C	U
2'-0"	1½"	472	1191	624	1576	—	—	443	761	587	1006	—	—	435	549	595	750	—	—	425	434	563	575	—	—
	2"	783	1978	995	2513	243	614	737	1262	936	1604	228	392	604	911	917	1158	224	282	573	721	897	916	197	224
2'-6"	1½"	378	764	500	1011	—	—	356	488	470	645	—	—	349	353	476	481	—	—	342	278	452	369	—	—
	2"	611	1268	797	1611	194	393	590	810	750	1029	183	251	578	584	734	742	179	181	566	463	719	587	176	143
3'-0"	1½"	315	532	418	703	—	—	300	340	393	450	—	—	300	245	398	335	—	—	300	194	378	258	—	—
	2"	524	882	665	1121	162	273	492	563	626	716	152	174	483	407	614	517	150	126	473	322	601	409	147	100
4'-0"	2"	394	498	501	633	—	—	372	318	472	404	—	—	364	230	463	292	—	—	356	182	454	232	—	—

Note: Steel treads—exceed concentrated and uniform live load capacities required by major building codes; intermediate stringer recommended for spans over 4 ft. Aluminum treads—exceed uniform live load capacity required by major building codes; not recommended for spans over 36 in.

specifications

Note to architect: "Specification Drawings" of GRIP STRUT Grating Products, G-52, and "Design Drawings for Stair Systems", G-404, are available, at no cost, for use in design and drawing preparation. Ask your GRIP STRUT Grating distributor for them.

scope—The contractor shall supply all labor, material and equipment to install GRIP STRUT Grating and GRIP STRUT Stair Treads, as specified, in all areas where shown on the drawings. Approved shop drawings are required before work proceeds.

grating materials—Shall be GRIP STRUT Grating, as manufactured by the Metal Products Division, United States Gypsum Company, with the following characteristics:

- Type:** (GRIP STRUT Safety Grating) (GRIP STRUT Safety Grating Walkway) (GRIP STRUT Non-serrated Grating).
- Metal:** (carbon steel) (hot dipped mill-galvanized steel) (stainless steel alloy type 304) (aluminum alloy 5052).
- Finish:** (mill-galvanized before fabrication) (painted—one standard shop coat of aluminum primer) (unfinished, oiled).
- Metal gauge:** (14-ga. steel) (12-ga. steel) (16-ga. stainless steel) (.080 aluminum), (choose size from table).
- Section width:** (4¾") (7") (9½") (11¾") (18¾") (24"), (choose size from table).
- Channel depth:** (1½") (2") (2½") (3"), (choose size from table).

stair tread materials—Shall be GRIP STRUT Grating, as manufactured by the Metal Products Division, United States Gypsum Company, with the following characteristics:

- Type:** (GRIP STRUT Safety Stair Tread) (GRIP STRUT Stair Tread), (Standard Nosing) (Abrasive Nosing).
- Metal:** (carbon steel) (hot dipped mill-galvanized steel) (stainless steel alloy type 304) (aluminum alloy 5052).
- Finish:** (mill-galvanized before fabrication) (painted—one standard shop coat of aluminum primer) (unfinished, oiled).
- Tread depth:** (2 dia. 4" wide) (3 dia. 7" wide) (4 dia. 9½" wide) (5 dia. 11¾" wide), (choose size from table).
- Channel height:** (1.5") (2.0"), (choose size from table).
- Gauge:** (14-ga. steel) (12-ga. steel) (16-ga. stainless steel) (.080 aluminum), (choose size from table).
- Span or width of staircase:** (24") (30") (36") (48"), (choose size from table).

installation—Grating and stair treads shall be installed as directed by manufacturer using (welds) (bolts) (anchoring devices).

distribution

GRIP STRUT Safety Grating and GRIP STRUT Safety Stair Treads are stocked by distributors in principal cities. Consult the local classified telephone directory under Gratings—Steel Floor for qualified assistance.

description and utility

THERMAFIBER Insulation Products consist of spun mineral fibers formed into mats of varying dimensions and densities depending on use, or into pellet forms for pouring or blowing into framing spaces. They are available in six types of blankets, in loose fill, and as semi-rigid safing, curtain wall and column fireproofing insulation.

Compared to other types of insulation, **THERMAFIBER** has superior resistance to heat and sound transmission, resilience that assures full installed thickness, and outstanding durability. Its greater rigidity aids staying in place. In manufacturing it is quality-controlled from start to finish. Other features:

Noncombustible—the mineral fibers will not burn or support combustion. Use of **THERMAFIBER** blankets increases fire ratings of certain partition assemblies. As a semi-rigid felt, **THERMAFIBER** is an excellent fire barrier between floors of high-rise, curtain-wall buildings; provides column fire protection. When subjected to ASTM E119 time-temperature criteria, **THERMAFIBER** Insulation remains intact and is significantly superior to glass-fiber insulation in fire resistance.

Vapor Resistance—two types of **THERMAFIBER** blankets have built-in vapor barriers to protect against condensation—of aluminum foil or strong asphalted paper with excellent vapor permeability factors of 0.30 and less than 1.00 perm respectively. Highly effective in sidewalls when used with USG Gypsum Sheathing and Foil-Back SHEETROCK Gypsum Panels, Foil-Back ROCKLATH Plaster Base or Foil-Back IMPERIAL Gypsum Base.

Nondeteriorating—the mineral fibers offer no sustenance to vermin; are resistant to decay and corrosion.

Moisture Resistance—mineral fibers do not absorb moisture. If wet, they dry quickly with adequate ventilation and recover their original insulating efficiency.

Rigidity, Strength—**THERMAFIBER** blankets have exceptional built-in rigidity, especially important for ceiling work. Batts have triple-thick, extra-wide flanges which make installation quicker and more secure.

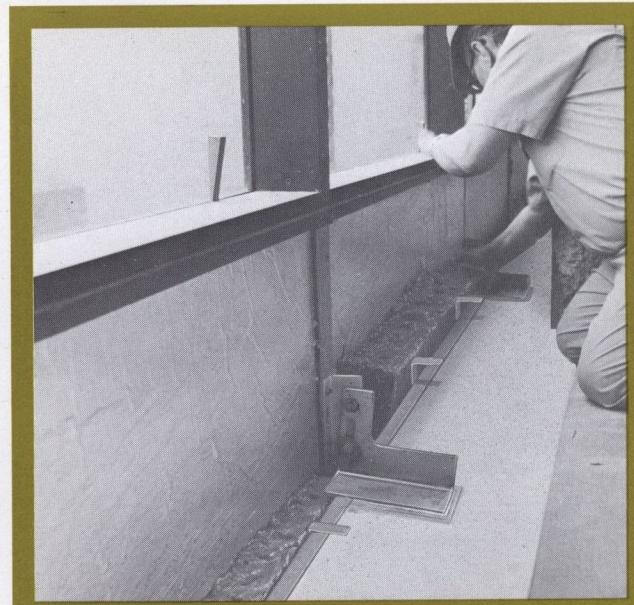
Sound Control Value—**THERMAFIBER** blankets increase sound isolation and STC ratings when used in certain partition and floor/ceiling assemblies. Their acoustical absorption properties can be utilized to reduce noise levels and reverberation.

Ventilation—insulation of attics and crawl spaces should be accompanied by adequate ventilation. HUD/FHA recommendations of one sq. ft. free vent area per 150 sq. ft. of attic or basementless floor area should be followed to help reduce air conditioning costs and control moisture condensation.

general limitations

1. Although the vapor barriers of **THERMAFIBER** blankets protect against the formation of condensation and reduce the danger of damage caused by condensation, over-humidification must be guarded against. If the relative humidity in the building is excessive, steps must be taken to reduce the sources of moisture.

2. If **THERMAFIBER** Insulation is placed in direct contact with exterior walls, the masonry must be watertight. Positive vapor barriers such as Foil-Back SHEETROCK or ROCKLATH or 4-mil polyethylene film should be applied to room side of furring



THERMAFIBER Safing Insulation fits between deck and spandrel panel.

members in order to reduce possibility of condensation on cold masonry walls.

3. Blankets placed between floor joists over unexcavated or basement areas should be supported by wire mesh, woven tie-wire or flexible metal rods.

4. Additional support is required for 5 1/4" and 6" thick blankets when joist spacing exceeds 16" o.c. and for blankets 3" or thicker installed between joists over suspended ceilings in high-humidity areas.

thermal insulating properties

In this era of fuel shortage, adequate insulation is an important part of the government's energy-conservation program. Proper insulation reduces heat transmission through walls, ceilings and floors to control interior temperatures for added comfort and fuel savings. Insulation is unique in amortizing its cost with dividends from lower heating/cooling costs.

High thermal performance—the no. 1 requirement of insulation—is assured with **THERMAFIBER** Insulation, which also provides significantly superior fire resistance compared to low-melt point glass fiber insulation.

In accordance with industry standards, **THERMAFIBER** Insulation products are labeled to show each product's thermal resistance (of insulation only) and thickness. Resistance and conductance values listed below are for insulating blankets shown on pages 2 and 3.

product & thickness	therm. resist. (R) (insul. only)	conductance (C)	product & thickness	therm. resist. (R) (insul. only)
kraft-faced blankets				
6"	22	0.045	6"	22
5 1/4"	19	0.051	5 1/4"	19
3 5/8"	13	0.074	3"	11
3"	11	0.090	2 5/8"	9

NOTE: All **THERMAFIBER** Blankets are manufactured to possess conductivity (k) of 0.27 and resistance (1/k) of 3.70, per in. thickness.

thermal resistance values* (R=1/C)
for use in calculating heat transmission coefficients (U)

2 $\frac{5}{32}$ " insulating sheathing (1).....	2.06	½" gypsum panels.....	0.45
½" insulating sheathing (1).....	1.32	¾" plaster base.....	0.32
½" gypsum sheathing (1).....	0.45	½" sanded plaster.....	0.09
½" plywood.....	0.63	½" plaster with lightweight aggregate.....	0.32
¾" plywood.....	0.94	portland cement with sand aggregate (per in.).....	0.20
¾" hardboard.....	0.18	4" common brick.....	0.80
2 $\frac{5}{32}$ " softwood (pine).....	0.98	4" face brick.....	0.44
¾" hardwood.....	0.68	8" clay tile.....	1.85
asbestos shingles.....	0.21	8" concrete block with sand aggregate.....	1.11
1"x8" wood drop siding.....	0.79	vapor-permeable felt.....	0.06
¾"x10" beveled wood siding.....	1.05	vapor barrier plastic film.....	negl.
exterior stucco (per in. thickness).....	0.20	carpet and fiber pad.....	2.08
¾" built-up roofing.....	0.33	floor tile—asphalt, vinyl.....	0.05
wood shingle roofing.....	0.94		
asphalt shingle roofing.....	0.44		

(1) Based on data by United States Gypsum

(type of insulation)
non-reflective reflective

air space values		
1" to 4" heat flow up.....	0.94	2.73
1" to 4" heat flow down.....	1.08	4.41
¾" to 4" heat flow horizontal.....	1.01	3.45
air surface values		
heat flow up.....	0.61	1.32
heat flow down.....	0.92	4.55
heat flow horizontal, outside air (15 mph velocity).....	0.17	—
heat flow horizontal, inside air (still).....	0.68	—

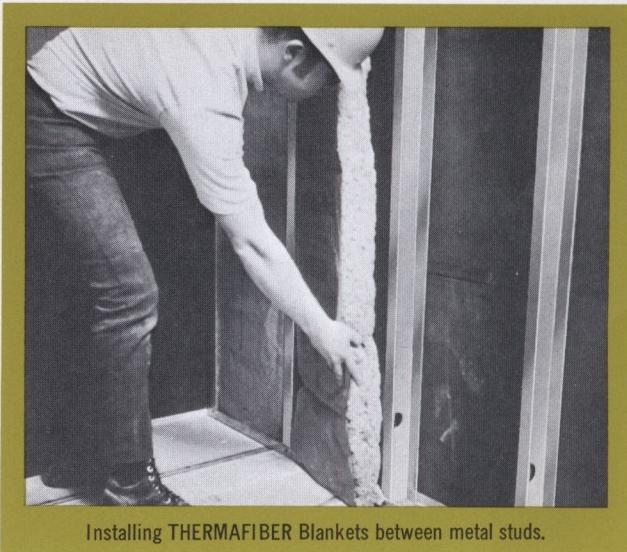
*Based on listings in ASHRAE Guide & Data Book.

sound control properties

THERMAFIBER Insulation has excellent sound-absorbing properties in addition to providing thermal values. Sound-absorbing materials absorb energy from sound waves and convert it to heat. As energy is absorbed, there is a proportional reduction in the amount of sound transmitted.

Two types of THERMAFIBER Insulation are used for their acoustic properties:

THERMAFIBER Regular Blankets, enclosed in heavy paper, are used in wood-frame construction; **THERMAFIBER Z-Furring Blankets** and **THERMAFIBER Sound Attenuation Blankets**, paperless and of greater density, are designated in fire-rated assemblies. THERMAFIBER Insulation in partition cavities improves STC ratings up to nine points.



Installing THERMAFIBER Blankets between metal studs.

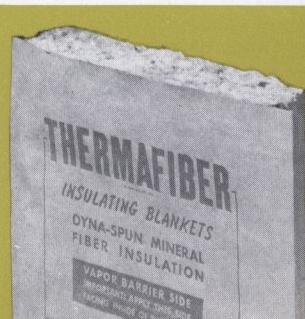
Sound ratings are based on tested results of specific components and details of assembly, not on the ceiling or partition membrane alone (see Construction Selector for tested assemblies). The sound control of an assembly cannot be accurately predicted if insulation of a lesser density is substituted.

types and functions

insulating blankets

THERMAFIBER Regular Blankets are faced on one side with strong asphaltated vapor barrier that extends to form nailing flanges, and are encased on the other sides with porous, kraft breather paper. These blankets also are supplied open-faced without breather paper. **Uses:** ceilings, floors, walls. Where installed from the cold side of framing, is in crawl spaces, blankets are held in place with chicken wire, tie wire stapled or nailed to joists or by using flexible metal rods. Available in 3" to 6" thicknesses and in widths to accommodate common structural spacings. Meets Federal Specs. HH-I-521E Type II and ASTM C665.

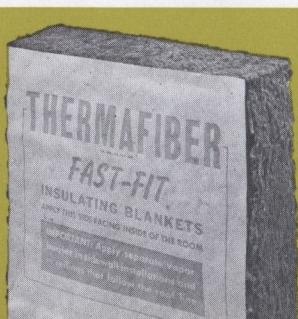
THERMAFIBER Aluminum Foil-Faced Blankets are similar to paper-enclosed Regular Blankets, but with highly reflective aluminum foil laminated to vapor barrier side. Blankets re-



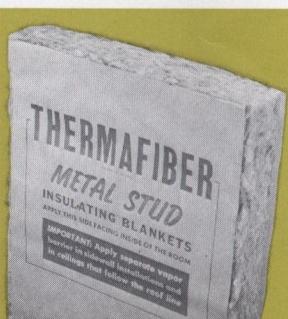
THERMAFIBER
Regular Blanket



THERMAFIBER
Aluminum Foil-Faced Blanket



THERMAFIBER
Fast-Fit Blanket



THERMAFIBER
M-S Blanket

quire a minimum air space next to the foil of $\frac{3}{4}$ " in sidewalls and 1" in ceilings to fully benefit from the foil reflectivity. **Uses:** ceilings, walls, floors with air space—most effective with air-conditioning and in areas of extreme summer temperatures. Available in $2\frac{3}{8}$ ", 3", $5\frac{1}{4}$ " and 6" thickness, 15" and 23" widths. Meets Federal Specs. HH-I-521E Type III and ASTM C665.

THERMAFIBER Fast-Fit Blankets have no flanges, thus eliminate need for staple fastening; are made slightly wider than normal to give snug friction fit between studs; open-faced on breather side. **Uses:** for sidewalls only. Fast-Fit Blankets require a separate vapor barrier, such as Foil-Back SHEETROCK Gypsum Panels, ROCKLATH or IMPERIAL Plaster Bases, or a 4-mil polyethylene film. Available in 3" and $3\frac{3}{8}$ " thickness, 15" width. Meets Federal Specs. HH-I-521E Type II and ASTM C665.

THERMAFIBER M-S Blankets are specially designed for insulating *exterior* furring and curtain wall assemblies which utilize steel studs. They are flangeless, open-faced on breather side and require same types of separate vapor barrier as Fast-Fit Blankets. Staple-attached to gypsum sheathing or held in place against metal lath with horizontal tie-wires. Available in 3" and $3\frac{3}{8}$ " thickness, 16" and 24" width, 48" and 96" length. Meets Federal Specs. HH-I-521E Type II and ASTM C665.

THERMAFIBER Z-Furring Blankets are designed for use as an effective semi-rigid insulating material in exterior wall furring applications using USG Z-Furring Channels. They require same types of separate vapor barrier as Fast-Fit Blankets. Blankets are a paperless, semi-rigid spun mineral fiber mat, 1", $1\frac{1}{2}$ " and 2" thickness with 6.0, 4.5 and 4.0 pcf density respectively, 0.24 "k" value, 24" width, 48" length. Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Meets Federal Specs. HH-I-521E Type I except identification marking paragraph 3.7.1.

sound attenuation blankets

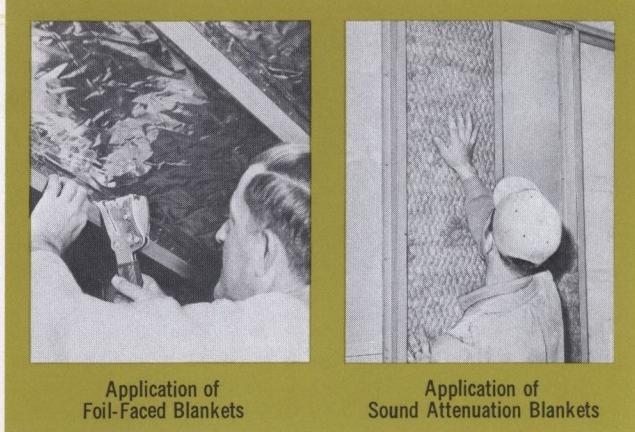
THERMAFIBER Sound Attenuation Blankets are a paperless, semi-rigid spun mineral fiber mat which substantially improves STC ratings when used in stud cavities of U.S.G. partition assemblies. Each blanket has a dense, highly complex labyrinthine structure composed of millions of sound-retarding air pockets. Available in 1", $1\frac{1}{2}$ " and 2" thickness with 4.0, 3.0 and 2.5 pcf density respectively, and 24" width, 48" length; $1\frac{1}{2}$ " and 2" thickness also available 16" wide. Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Meets Federal Specs. HH-I-521E Type I except identification marking paragraph 3.7.1.

THERMAFIBER Sound Attenuation Blankets are used in various partition systems listed at right (for details see Construction Selector—in Sweet's Sec. 9.5).



THERMAFIBER
Z-Furring Blanket

THERMAFIBER
Sound Attenuation Blanket



Application of
Foil-Faced Blankets

Application of
Sound Attenuation Blankets

Drywall Partitions

	STC Rating
Steel Stud—Double Layer Gypsum Panels	52 to 55
Steel Stud—Single Layer Gypsum Panels	45 to 57
Movable	45 to 50

Veneer Plaster Partitions

Steel Stud—Double Layer Gypsum Base	48 to 53
Steel Stud—Single Layer Gypsum Base	45
TRUSSTEEL Stud—Resilient Gypsum Base	48

Conventional Plaster Partitions

Gypsum Tile—Resilient Gypsum Lath	55
TRUSSTEEL Stud—Resilient Gypsum Lath	46 to 52

safing insulation

THERMAFIBER Safing Insulation is a precision-preformed, semi-rigid mineral fiber felt, designed for use as a fire stop in the safe-off area of curtain-wall high-rise construction. Also used for filling openings around pipes, ducts and telephone lines in new and existing buildings. It is noncombustible, non-corrosive to steel or aluminum, vermin-proof, moisture-resistant, mildew-proof and sound-absorbent; installed between concrete floor and spandrel panel. Insertion on support brackets or impaling clips is recommended. Available in sizes to meet project requirements, 2" to 4" thick, 24" standard width, length varies by U.S.G. plant: from Corsicana, Tex. 45"; S. Plainfield, N.J., 60"; Tacoma, Wash. 45"; Wabash, Ind. 48" or 60". Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Meets Federal Specs. HH-I-521E, Type I, except identification marking paragraph 3.7.1; HH-I-558B, Form A, Classes 1 and 2.

function

Fire Resistance—provides effective 3-hr. fire barrier between floor and exterior curtain wall (see Test Procedure, page 4).

Smokeless Composition—THERMAFIBER Safing Insulation is noncombustible and produces no smoke when exposed to fire.

High Temperature Protection—fibers in THERMAFIBER Safing Insulation will not melt until temperature exceeds 2,000°F.; offer 50% greater fire safety than glass fibers which melt and lose resistance to fire at about two-thirds the temperature required for THERMAFIBER Safing Insulation.

Density—4 pcf. nom.

Thermal Conductivity (k)—0.24.

(continued on page 4)

safing insulation (continued from page 3)

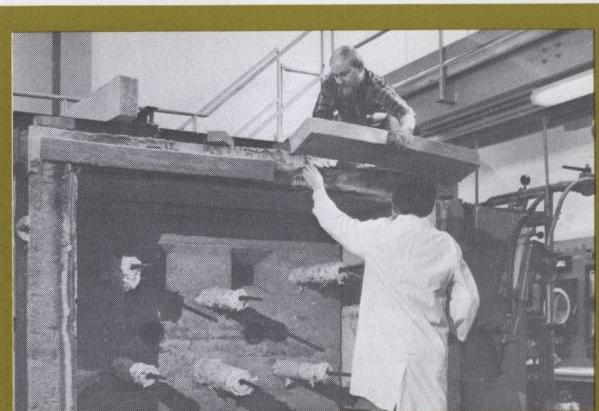
Sound Attenuation—49 STC was achieved with 4" thick THERMAFIBER Safing Insulation installed between uncaulked, steel cover plates in combination with a 54 STC concrete panel. This rating was superior to that of 2-psf sheet lead.

fire test procedure

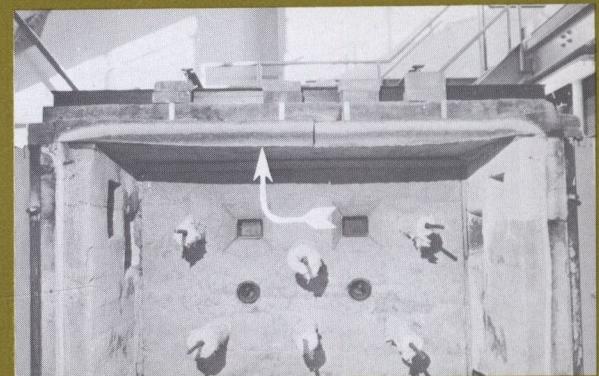
Since there are no established tests for safing materials, and in order to develop an effective fire stop, United States Gypsum designed a testing procedure for use at its Research Center. Results of these tests have been accepted by code bodies throughout the nation.

THERMAFIBER Safing Insulation was tested by this method and endured over 3 hours of exposure to intense fire without losing its fire-stopping ability. The test was conducted in a furnace similar to that specified in ASTM E119 except with a 6'9" x 7'0" opening. The furnace top was rolled back 7½" to simulate floor-slab construction, and a typical curtain-wall assembly was used to close the furnace face. Two pieces of 4-pcf density THERMAFIBER Safing Insulation, 4" thick, 8" wide and 41" long, were installed with the joint centered for maximum exposure (see photo, upper right). The curtain wall was moved into place, compressing the insulation to 7½". Furnace temperatures conformed to the ASTM E119 time-temperature curve. Immediately prior to termination of the test, cotton waste was placed on the unexposed surface of the insulation; it did not ignite. The test was terminated at 195 minutes, with the THERMAFIBER Safing Insulation still in place, providing a barrier to the passage of flame and hot gases (center photo). The exposed surface of the insulation had changed color, but was still intact (lower photo).

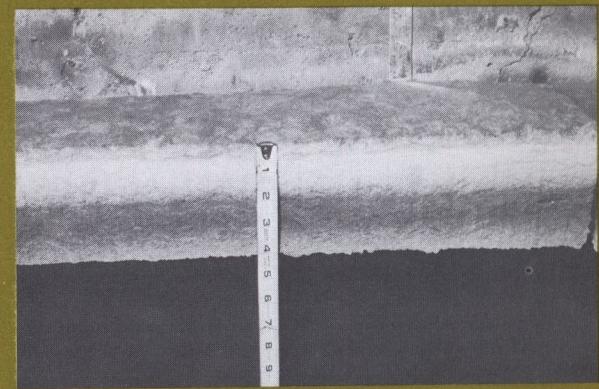
Backed by these credentials, the product has been quickly adopted for use in several of the world's tallest buildings.



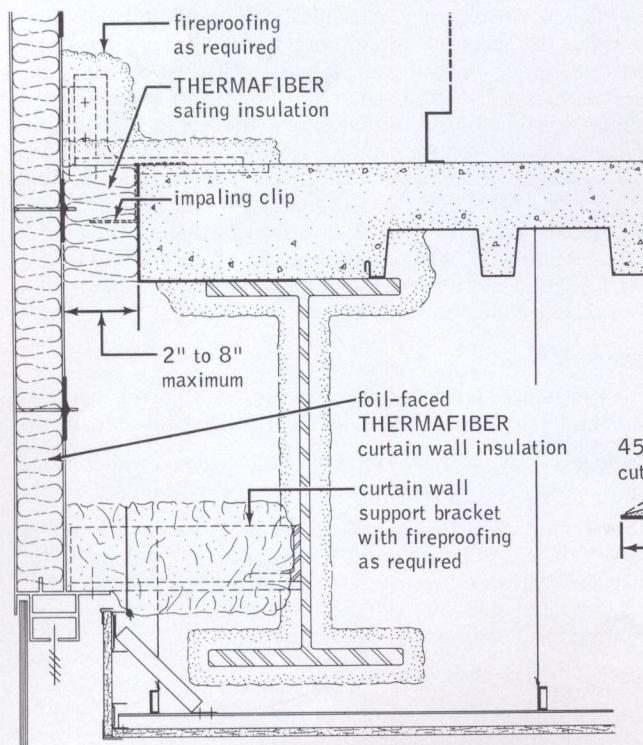
Placing THERMAFIBER Safing Insulation in test furnace.



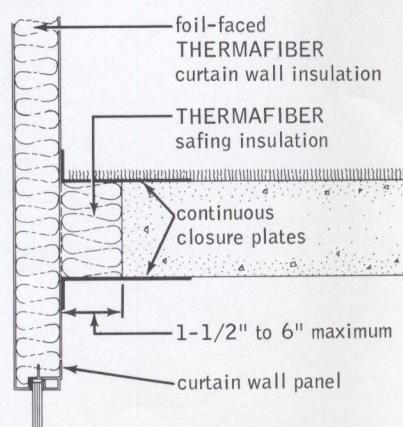
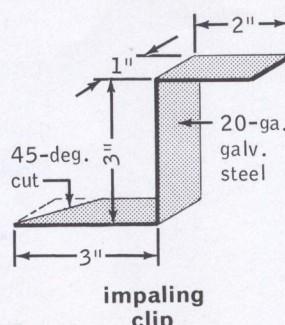
THERMAFIBER Safing Insulation after test.



Insulation after test shows no change except discoloration.



in structural steel framing systems



in flat plate framing systems

curtain wall insulation

THERMAFIBER Curtain Wall Insulation is a fire-resistant, mineral-fiber insulation used in spandrel panels, exterior column covers and other metal-faced wall assemblies. Suitable for both prefabricated and field-assembled units, these blankets will not corrode steel, aluminum, copper or other metal wall facings. Their high thermal efficiency (see data below) helps eliminate condensation problems. They are vermin-proof, moisture-resistant and mildew-proof.

THERMAFIBER Curtain Wall Insulation is available in precision-preformed, semi-rigid blankets that range from 4.0pcf to 8.0pcf density. Two forms are produced (see table below for physical data and sizes):

Regular Blankets, used in double-faced metal wall panels, supplied without covering; meet fire ratings listed below. Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0.

Foil-Faced Blankets, used in single-faced metal panels, supplied with an aluminum-foil facing applied on the vapor-barrier side. Foil-faced blankets (designated by letter "F" following type no.) have the added advantage of eliminating need for a separate vapor barrier. Moisture permeability of the foil is less than one perm. Fire hazard classification: flame spread 25, fuel contributed 0, smoke developed 0.

Meets Federal Specs. HH-I-521E, Types I and III, except identification marking paragraph 3.7.1; HH-I-558B, Form A, Classes 1 and 2.

fire test procedure

Since there are no established tests for a spandrel panel and in order to develop effective fire protection for aluminum spandrel facings, U.S.G. designed a testing procedure for use at its Research Center. Tests were conducted using furnace time-temperature curves and recording procedures as specified in ASTM E119. The THERMAFIBER Curtain Wall Insulation effectively resisted the passage of flame to the exterior and kept the aluminum facing well below the melting point of the facing at the ratings listed below. Tests were conducted on blankets having a foil-facing which serves as a vapor barrier and is not required for fire rating.

Fire Containment Data

test duration†	product designation	thick-ness	test no.
1 hr.	CW 70	1½"	USG 6-3-71
2 hr.	CW 40(F)	2"	USG 10-18-71
2 hr.	CW 90(F)	2"	WJE-72481
3 hr.	CW 70(F)	3"	USG 11-30-71
5 hr.‡	CW 90	2"	USG 2-18-74

†Data based on ASTM E119 test conditions. ‡Test terminated to avoid furnace damage.

Thermal Performance Data

product	k-factor @ 75°F. Btu per hr. per sq. ft. °F./inch	"U" value of insulated spandrel*		
		1" thick	1½" thick	2" thick
CW 40	0.25	—	—	0.11
CW 70	0.24	0.20	0.14	0.11
CW 90	0.23	0.19	0.13	0.10

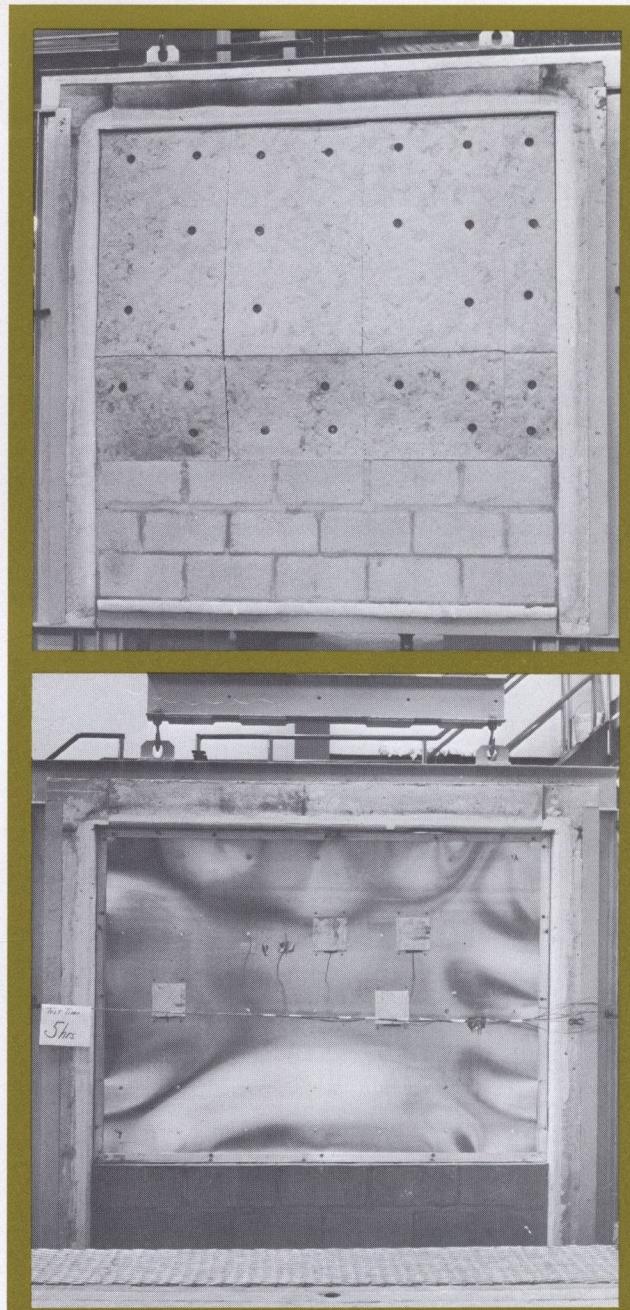
*Insulation attached direct to metal spandrel panel, "U" includes inside and outside air films.

Availability by U.S.G. Plants

product	S. Plainfield N.J.			Wabash Ind.†		
	min. thick.	max. thick.	width	min. thick.	max. thick.	width
CW 40	2"	4"	60"	2"	5"	48"
CW 70	1½"	2"	60"	1½"	3"	48"
CW 90	1"	2"	60"	1"	2"	48"

NOTE: Dimensional tolerances—width $\pm \frac{1}{8}$ ", length $\pm \frac{1}{8}$ ", thickness $- \frac{1}{8}'' + \frac{1}{4}''$.

†Aluminum foil facing available in all sizes from Wabash plant only.



THERMAFIBER Curtain Wall Insulation after 5 hrs.-5 min. exposure in test furnace. Insulation remains intact (top) and still affords protection to aluminum panel (below). Test was terminated without failure, to protect furnace.

Physical Data

product	nominal density— lb./cu. ft.	approx. density tolerances—lb./cu. ft.	minimum recommended thickness	container size	avg. wt. lb./ MBF, in.:		application method
					sleeve or bag	ctn.	
CW 40 (F)	4.0	± 0.5	2"	per customer specification	345	385	hand application fitted
CW 70 (F)	6.0	± 1.0	1½"	customer specification	595	635	
CW 90 (F)	8.0	± 1.0	1"	customer specification	760	800	

NOTE: Consult U.S.G. Sales Engineer for limitations applying on shipments in bags.

mineral fireproofing

THERMAFIBER Mineral Fireproofing is designed to provide a fast, inexpensive method for protecting steel columns and spandrel beams. This noncombustible semi-rigid felt offers greater resistance to fire than glass fiber insulation and does not emit toxic gases when exposed to fire. It contains no asbestos, is moisture and mildew-resistant and noncorrosive to steel and aluminum. It is installed dry, in units; keeps environment and working area clean. Easily attached either with 12-ga. wire weld-on or snap-on flange clips and 1½" diam. clinch shields or with ⅛" diam. cap-type steel studs welded through fireproofing. **Limitation:** Exposed columns should have suitable surfacing.

Available in sizes to meet project requirements, 2" and 2½" thick, 24" standard width, 48" or 60" lengths from Wabash, Ind. plant; 60" length from S. Plainfield, N.J., (2" thick only). Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Meets Federal Specs. HH-I-521E, Type I, except identification marking paragraph 3.7.1; HH-I-558B, Form A, Classes 1 and 2.

function

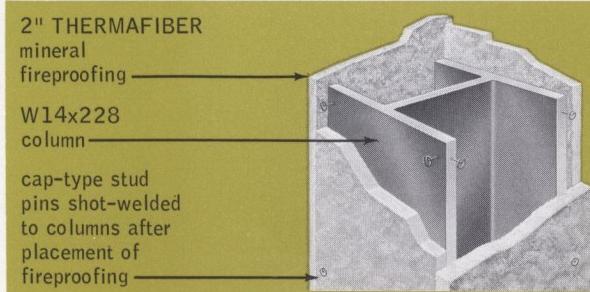
Lightweight—Density is 8 pcf., nom.

Fire Resistance—Provides superior fire protection per pound of fireproofing compared to other board and spray-on types. Ratings up to 4 hrs. for columns and 3 hrs. for beams available (see table below).

Nondeteriorating—the mineral fibers are resistant to decay and corrosion; offer no sustenance to vermin.

fire rating	description	UL Design No.	column or beam size
4 hrs.	Mineral Fireproofing 2" thick around column attached with ⅛" steel wire studs welded to column 24" o.c. max.	X202	W14 X228
3 hrs.	Mineral Fireproofing double-layer 2" thick around column attached with 12-ga. flange clips and clinch shields spaced 16" o.c. max.	X306	W10 X49
3 hrs.†	Mineral Fireproofing double-layer 2" thick around beam attached with 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2½" concrete on cellular steel floor units.	N304	W8 X24
2 hrs.	Mineral Fireproofing 2½" thick around column attached with 12-ga. flange clips and clinch shields spaced 24" o.c. max.	X305	W10 X49
2 hrs.‡	Mineral Fireproofing double-layer 2" thick around beam attached with 12-ga. flange clips and clinch shields spaced 16" o.c. max.—¾" concrete on fluted steel floor units.†	D915	W8 X13
2 hrs.‡	Mineral Fireproofing 2" thick around beam attached with 12-ga. flange clips and clinch shields spaced 12" o.c. max.—2½" concrete on fluted steel floor units.	N305 N304‡	W8 X24

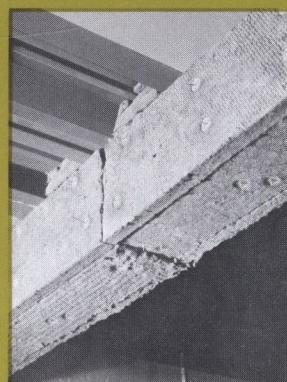
†Restrained beam rating; unrestrained beam rating is 2 hrs. ‡Rating 1½ hrs. if cellular steel floor units are used.



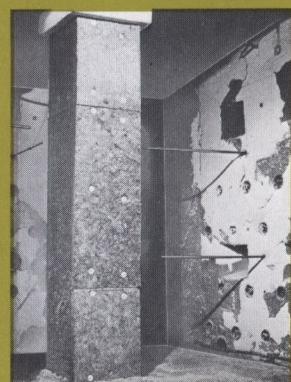
4-Hr. UL Design X202



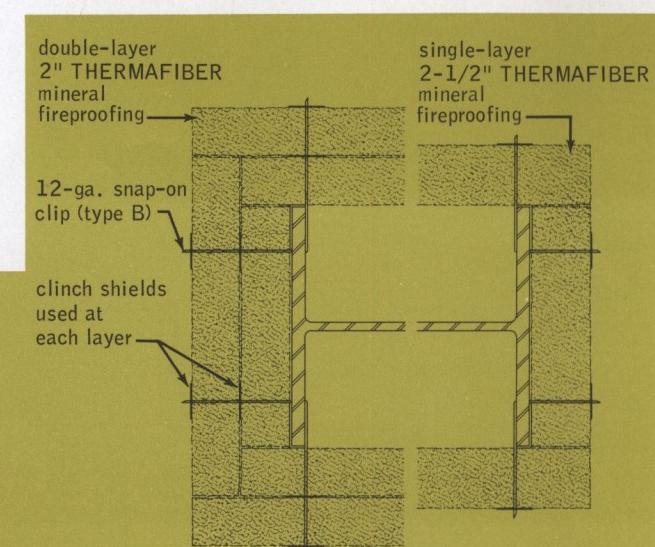
Fireproofing units shown in place over spandrel beams on bank building.



Lightweight, dry fireproofing surrounds beam supporting steel floor units.

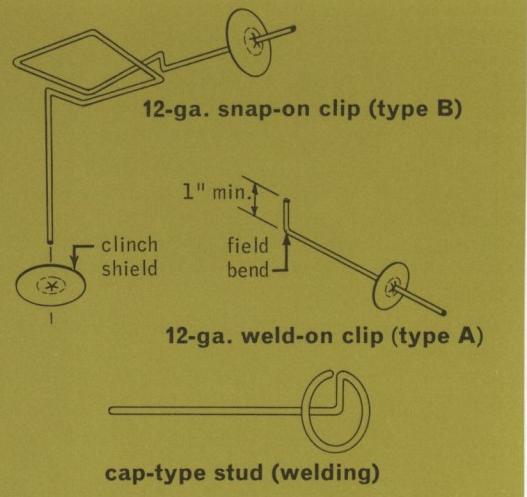
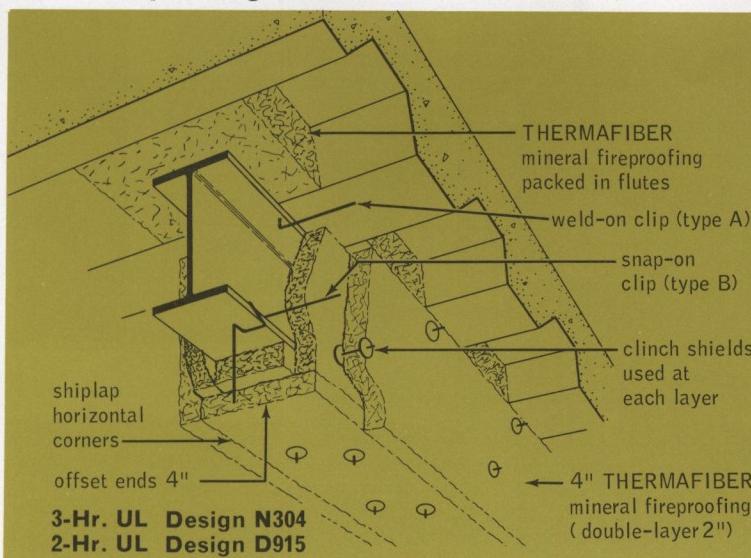


Flange clips and clinch shields secure fireproofing to column.



3-Hr. UL Design X306

2-Hr. UL Design X305

beam fireproofing details**granular insulation**

THERMAFIBER Blowing Wool consists of mineral fiber formed into pellets for installation by pneumatic machine. Fire hazard classification: flame spread 10, fuel contributed 0, smoke developed 0. **Uses:** in attics or floors directly over ceiling; in wall spaces of existing buildings. Meets Federal Specs. HH-I-1030a Type I Class A. HUD now requires blowing wool installation to meet specific "R" values with thicknesses, coverages and weights as listed below:

"R" value ⁽¹⁾ at 75°F, mean temp.	min. thickness	min. no. bags per 1,000 sq. ft.	max. net coverage	min. weight
To obtain an insulation thermal resistance of:	Installed insulation should be not less than:	Not less than no. shown should be used:	Contents of each bag should not cover more than:	Weight per square foot of installed insulation should not be less than:
R-30	10½"	56	18 sq. ft.	1.66 lb.
R-22	7½"	42	24 sq. ft.	1.25 lb.
R-19	6½"	36	28 sq. ft.	1.07 lb.
R-11	3¾"	21	48 sq. ft.	0.63 lb.

(1) At recommended applied density of 2.0pcf.

THERMAFIBER Handy Fill is mineral fiber made in nodule form for spreading by hand. Has excellent uniformity and a special treatment to reduce dust. Ideal for insulating horizontal areas in remodeling to add insulation value, conserve energy. **Uses:** in attics or floors accessible from above, installed directly into joist cavity. Meets Federal Specs. HH-I-1030a Type II.

For applied thicknesses, coverages to provide desired "R" values, refer to U.S.G. Direction Sheet IW-162.

specifications**note to architect**

See U.S.G. Construction Selector for STC ratings of partition and floor/ceiling assemblies with THERMAFIBER Insulation; U.S.G. Product Folder SA-927 for USG Sound Deadening Board.

Part 1: general**1.1 scope—Specify to meet project requirements.****1.2 qualifications**

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

Part 2: products**2.1 materials**

2.1.1 Insulating Blankets: THERMAFIBER (Regular) (Open-Faced) (Foil-Faced) (Fast-Fit) (M-S) (Z-Furring) blankets, () thick, () wide, () long.

2.1.2 Sound Attenuation Blankets: THERMAFIBER Sound Attenuation Blankets, () thick, () wide, 48" long, () pcf density.

2.1.3 Safing Insulation: THERMAFIBER Safing, () thick, () wide, () long, 4 pcf min. density, (having fire-rated foil facing) (with galvanized steel impaling clips) (with fire-resistant adhesive).

2.1.4 Curtain Wall Insulation: THERMAFIBER Curtain Wall, Type (), (Regular) (Foil-Faced) blankets, () thick, () wide, () long.

2.1.5 Structural Fireproofing: THERMAFIBER Mineral Fireproofing, () thick, () wide, () long.

2.1.6 Granular Insulation: THERMAFIBER (Blowing Wool) (Handy Fill), applied () thick to provide a Resistance of ().

Part 3: execution**3.1 insulating blanket application**

Install THERMAFIBER Insulation in framing spaces, including areas between floor joists and outside headers, leaving no voids. Install behind electrical outlets, around structural obstructions, jambs, sills, etc. Cover all such areas as well as plates and headers with vapor barrier paper.

a. Insert flanged blankets between framing members, vapor barrier facing inward and recessed ($\frac{3}{4}$) (1") from face of framing, flanges stapled to sides of framing members at each end of blanket and along length of flanges. Staple flanges 8" o.c. max. on ceilings, 6" o.c. max. on walls and 4" o.c. max. on floors. Use $\frac{1}{16}$ " staples in a trigger or power stapler.

If required by local code, flanges on vapor barrier sides of blankets may be stapled to faces of framing members providing abutting flanges do not overlap and are stapled flat, without bulges or folds that will prevent tight attachment of interior surfacing materials.

b. Install Fast-Fit Blankets between studs from interior side of wall, recessed slightly from stud faces. Do not staple—friction-fit holds blankets in place. Provide separate vapor barrier with installation of: Foil-Back (SHEETROCK Gypsum Panels) (ROCKLATH Plaster Base) (IMPERIAL Gypsum Base) (4 mil polyethylene film).

c. Install M-S Blankets between studs from interior side of wall. Attach blankets to gypsum sheathing using $\frac{1}{16}$ " staples with divergent points placed at each corner and in center of each blanket. Hold blankets tightly against metal lath backing with taut horizontal tie-wires spaced max. 36" o.c. Provide separate vapor barrier same as for Fast-Fit Blankets.

d. Apply granular insulation (with pneumatic blowing machine according to U.S.G. directions to achieve a density of 2 lbs./cu. ft.) (manually and spread to required thickness) to provide a Resistance of (). Apply to uniform thickness. Keep soffit vents open.

3.2 furring blanket application

Position Z-Furring Blanket vertically against wall surface. Hold in place with a USG Z-Furring Channel according to U.S.G. directions. Position next blanket so that it abuts attached furring member and hold in place with next furring channel.

3.3 sound blanket application

Install THERMAFIBER Sound Attenuation Blankets in stud cavities of sound-rated partitions, attaching to one base layer of (SHEETROCK Gypsum Panels) (ROCKLATH Plaster Base) (IMPERIAL Gypsum Base).

Attach with five $\frac{1}{16}$ " long staples driven through each blanket, one in center and one spaced in approx. 3" from each corner. For reinforcement, drive staples to straddle drywall or similar nails placed against blankets, or through $1\frac{1}{2}$ " lengths of PER-A-TAPE Reinforcing Tape or equivalent. Butt ends of blankets closely together and fill all voids. Allow air space between backs of blankets and back of opposite face layer.

3.4 safing insulation application

Impale safing insulation of proper size on impaling clips spaced as needed and 24" o.c. max. Install insulation in safe-off area between curtain walls and floor slabs, leaving no voids.

3.5 curtain wall insulation application

(Press-fit) (Mechanically attach) curtain wall insulation to exterior wall. Install foil-faced insulation with foil facing inward. Butt ends and edges closely together and fill all voids.

3.6 column fireproofing application**3.6.1 UL Design X202-4 hrs.**

For all W14X228 columns, install THERMAFIBER Mineral Fireproofing 2" thick around column using $\frac{1}{8}$ " diam. steel wire studs welded to column after placement of fireproofing. Space studs 2" from top and bottom of assembly, 24" o.c. vertically and at least $\frac{3}{4}$ " from vertical edges.

3.6.2 UL Design X306-3 hrs.

Install 2" thick THERMAFIBER Mineral Fireproofing in double layer around column. Shiplap vertical corner joints and offset horizontal joints between layers. Impale insulation on 12-ga. wire snap-on clips friction-fitted over column flange and secure each layer with clinch shields. Space clips max. 16" o.c. and $3\frac{1}{2}$ " from ends of insulation.

3.6.3 UL Design X305-2 hrs.

Install THERMAFIBER Mineral Fireproofing $2\frac{1}{2}$ " thick around column. Impale insulation on 12-ga. wire snap-on clips friction-fitted over column flange and secure with clinch shields. Space clips max. 24" o.c. and $3\frac{3}{4}$ " from ends of insulation.

3.7 beam fireproofing application

Install 2" thick THERMAFIBER Mineral Fireproofing in double layer on sides and bottom of beam. Shiplap horizontal corner joints and offset joints between layers at least 4". Impale insulation on 12-ga. wire clips friction-fitted or welded to beam flanges and secure each layer with clinch shields. Space clips max. (12") (16") o.c. and 2" from ends of insulation. Stuff additional insulation between crests of fluted deck and beam.

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NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

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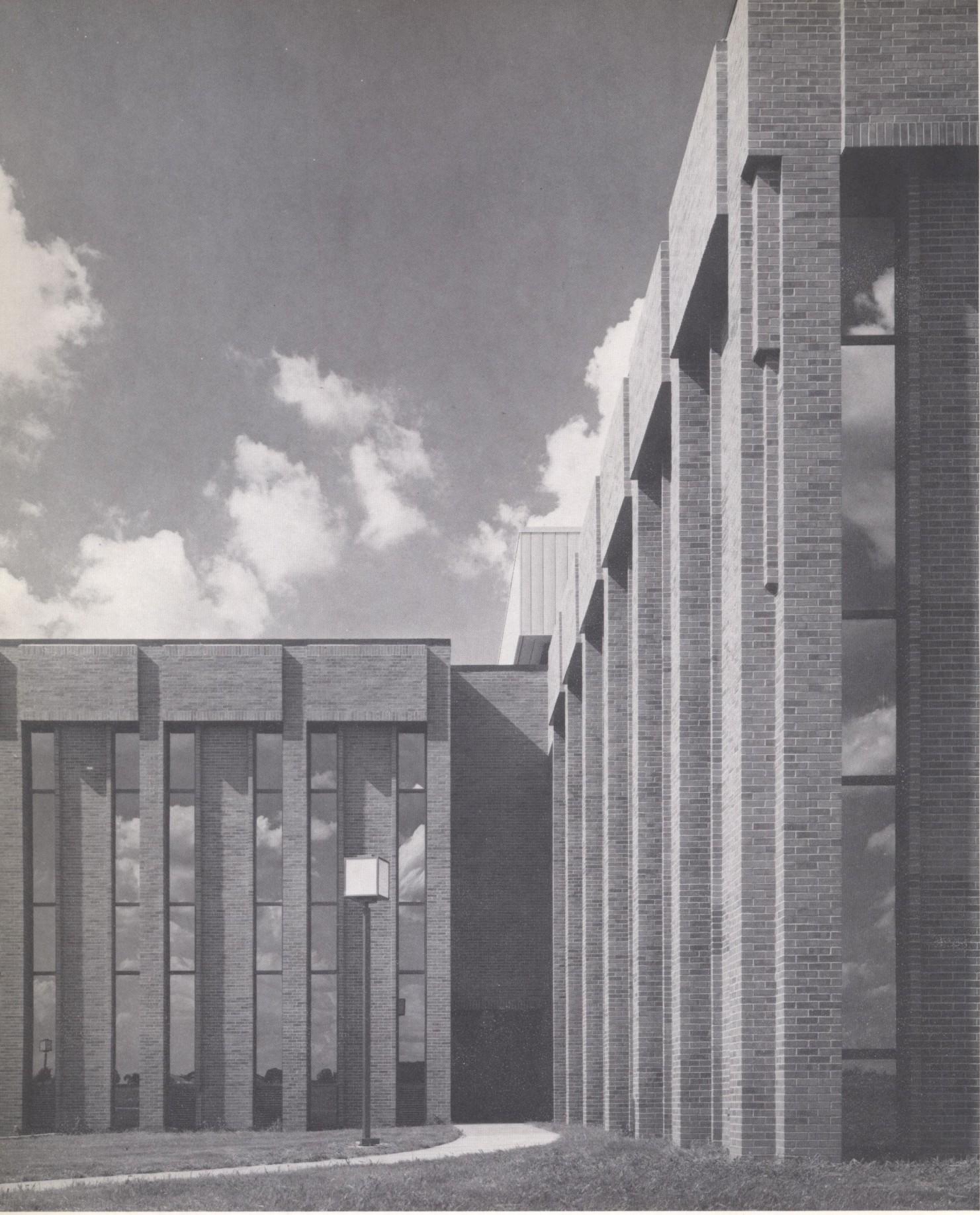
price
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curtain wall design manual

with Product and Construction Standards

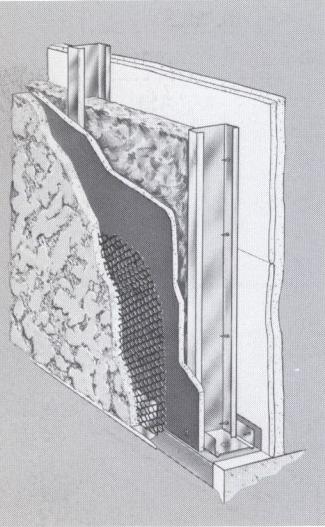
UNITED STATES GYPSUM



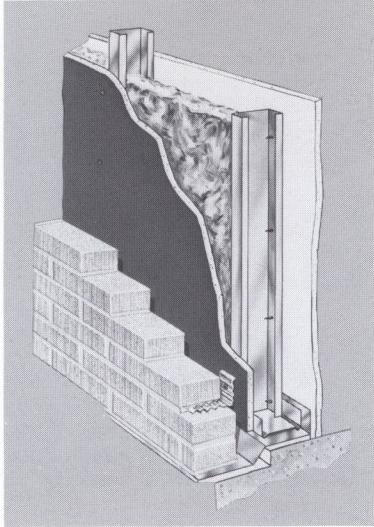
USG **curtain wall** **design manual**

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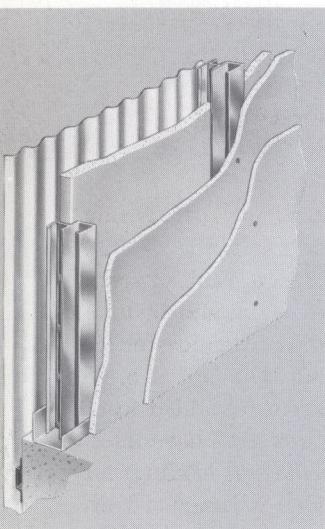
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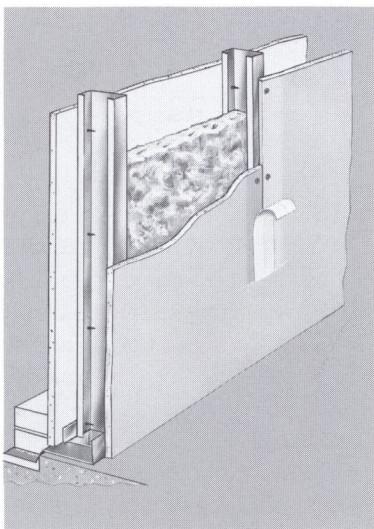
stucco exterior



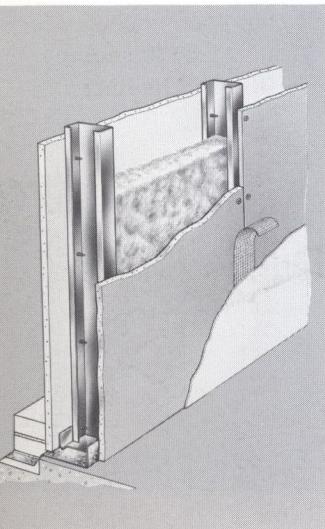
masonry exterior



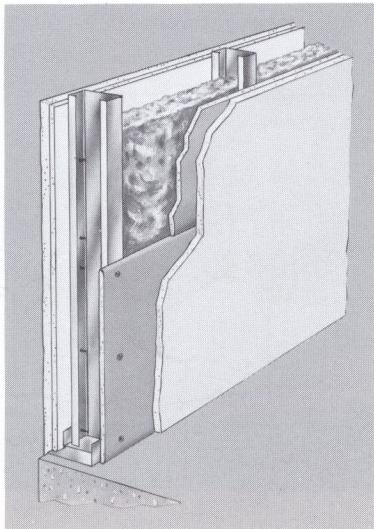
C-H Stud Infill Panel System exterior



gypsum drywall interior



veneer plaster interior



standard plaster interior

description

USG Curtain Wall Systems offer versatile ways to enclose a structure at low cost. Fabricated quickly on the job with conventional components, these lightweight, non-load bearing fire-resistant systems are highly insulative and suitable for concrete and steel frame structures.

Framing—The standard curtain wall system, uses USG Light Steel Studs for framing with THERMAFIBER Curtain Wall Insulation CW-40 or THERMAFIBER Metal Stud Blankets inserted in cavities between studs. A variety of interior and exterior finishes, as described below, is available to meet design requirements. For the C-H Stud Infill Panel Assembly, USG 20-ga. J-Runners and C-H Studs are used for framing.

Stucco Exterior—Portland cement-lime stucco is applied over metal lath. Stucco surface may be pretinted, painted, textured or accented with exposed colored aggregates.

Masonry Exterior—Unit masonry is laid with Portland cement-lime mortar.

Panel Exterior—Ceramic, aggregate or porcelain enamel panels or other lightweight dry exterior facings are screw-attached through sheathing to light steel studs. For the C-H Stud Infill Panel Assembly, special-design exterior panels are attached to horizontal metal girts (see page 12).

Gypsum Drywall Interior—Foil-Back SHEETROCK Gypsum Panels are screw-attached to the light steel studs. Interiors are finished with a U.S.G. joint system and DUR-A-BEAD or No. 800 Corner Reinforcement.

Veneer Plaster Interior—Foil-Back IMPERIAL Gypsum Base is screw-attached to light steel studs. IMPERIAL Plaster or DIAMOND Interior Finish is applied over this large-size base.

Standard Plaster Interior—Foil-Back ROCKLATH Plaster Base is screw-attached to steel studs and RED TOP or STRUCTO-LITE Gypsum Plaster is applied over the base.

advantages

Adaptability—USG Curtain Wall Systems can be used in most types of steel or reinforced concrete structures where the load is carried by the structural framing and not transferred to the curtain wall. For information on load-bearing steel framing for exterior walls, see your U.S.G. representative or write for U.S.G. brochure CS-4.

Fire Resistance—Up to 2-hour fire-resistance rating, meeting most code requirements.

Fast Assembly—USG Curtain Wall Systems are easily erected using components and application procedures familiar to mechanics.

Lightweight—These systems save 25% dead load in brick masonry walls and up to 66% in textured panel assemblies, vs. block or concrete construction, thus reducing structural requirements in foundations and footings.

Versatility—By varying size and spacings of studs, walls of various heights can be constructed to accommodate wind load requirements up to 40 psf (125 mph). Interior and exterior facings in various combinations meet specific functional and esthetic needs.

Sound Control—The dampening effect of air space and insulation within the framing reduces the airborne street noise transmitted to the interior.

Thermal Insulation—High thermal performance meets the "All-Weather Comfort Standard" for electrically heated and air-conditioned buildings.

Weather Resistance—Confirmed by tests certified by Robert W. Hunt Company, the systems meet air and water infiltration standards set up by HUD and NAAMM for 40 psf wind pressure which is equivalent to a wind velocity of 125 mph. In unusually high-wind areas where moisture may penetrate porous stucco and masonry exteriors, a water-resistive barrier such as building felt, applied over the gypsum sheathing, may be required.

component products

The products described and illustrated here are the basic materials recommended by United States Gypsum for curtain wall assemblies. For a complete description of accessory products, listed here by name only, refer to U.S.G. Technical Folders SA-917, SA-927, CS-4 and CS-8.

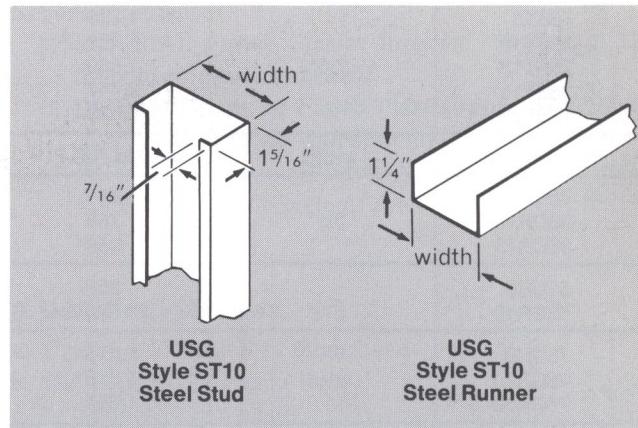
These materials are designed to meet the essential requirements of quality curtain wall construction. They have been developed to achieve the optimum results based on extensive laboratory tests and job-proven performance. The United States Gypsum Company name is your assurance of proven suitability.

1. Steel Framing Components

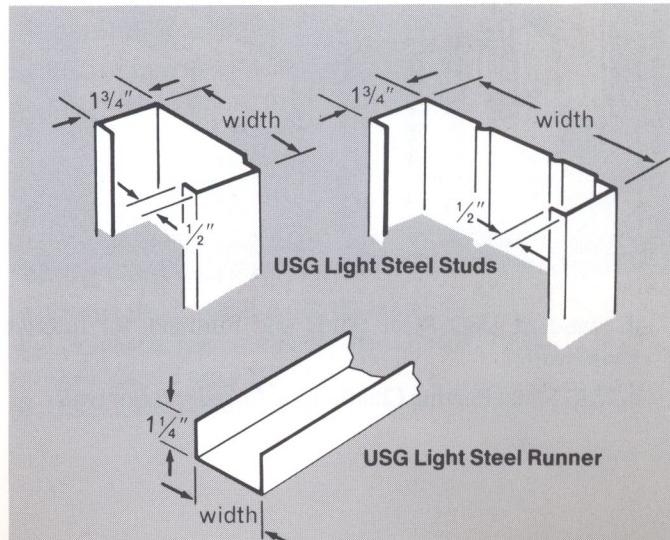
a. USG ST10 Steel Studs and Runners are strong non-load bearing channel-type sections roll-formed from hot-dipped galvanized steel. Studs are screw-attached to runners at top and bottom. Studs have $1\frac{1}{4}$ " knockout located $8\frac{1}{2}$ " from one end to facilitate pipe and conduit installation. Studs and runners are available in six widths—2", $2\frac{1}{2}$ ", 3", $3\frac{5}{8}$ ", 4" and 6"—stud in lengths up to 28 ft., runners (designed with $1\frac{1}{4}$ " unhemmed leg) in 10-ft. lengths. These items are made to order only. See Physical Test Data for properties and limiting height of studs on page 16.

stud style	width	wt.—lb./MLF ⁽¹⁾	
		stud	runner
20ST10	2"	643	551
212ST10	$2\frac{1}{2}$ "	704	613
30ST10	3"	767	675
358ST10	$3\frac{5}{8}$ "	844	753
40ST10	4"	891	800
60ST10	6"	1,140	1,049

(1) Average net shipping weight.



b. USG Light Steel Studs and Runners are load bearing channel-type framing members in three widths— $3\frac{1}{2}$ ", $5\frac{1}{2}$ ", $7\frac{1}{2}$ "—roll-formed from hot-dipped galvanized steel. Studs are screw-attached to runners at top and bottom. The stud configuration permits nesting in splices or for boxed studs without increasing width. The $3\frac{1}{2}$ " ST8, 10 and 13 studs have "crow's foot" design for added load-carrying capacity. Wider studs ($5\frac{1}{2}$ " and $7\frac{1}{2}$ ") have intermediate ribs which add resistance to lateral loadings for greater limiting heights. The stud web is punched with $1\frac{1}{4}$ " round holes 24" o.c. to simplify electrical and piping installation. Studs are available in 15 styles with lengths manufactured to order up to 28 ft. Runners are available in three styles (all with $1\frac{1}{4}$ " unhemmed leg) in 10-ft. lengths. CR13 runner styles are used with ST16 and ST20 stud styles. See Physical Test Data for properties and limiting height of studs.



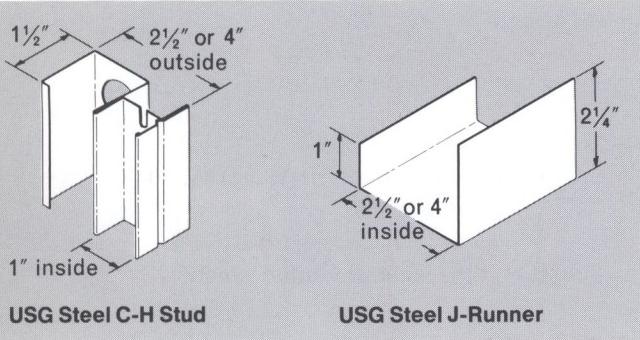
stud style	width	wt.-lb./MLF ⁽¹⁾
35ST8 35ST10 35ST13 35ST16 35ST20	3½"	799 948 1,218 1,600 1,969
55ST8 55ST10 55ST13 55ST16 55ST20	5½"	1,013 1,202 1,551 2,018 2,504
75ST8 75ST10 75ST13 75ST16 75ST20	7½"	1,226 1,457 1,880 2,447 3,039
runner style	width	wt.-lb./MLF ⁽¹⁾
35CR8 35CR10 35CR13	3½"	641 763 988
55CR8 55CR10	5½"	859 1,024
75CR8 75CR10 75CR13	7½"	1,073 1,278 1,654

(1) Average net shipping weight.

c. USG Steel C-H Studs and J-Runners are used in the USG C-H Stud Infill Panel Curtain Wall System. Studs are non-load bearing sections, 2½" or 4" wide, available in lengths as required; J-Runners are used at floor and ceiling, available in standard 10-ft. lengths. Both are formed from hot-dipped galvanized steel meeting ASTM A446-67, with min. G60 zinc coating.

stud style	width	wt.-lb./MLF ⁽¹⁾
212CH8 400CH10	2½" 4"	848 1,243
runner style	width	wt.-lb./MLF ⁽¹⁾
212JR7 400JR7	2½" 4"	533 678

(1) Average net shipping weight.



- d. Standard USG Steel Studs and Runners, for interior chase wall.
- e. USG Metal Furring Channel, for furred interior wall.

2. Sheathing

a. USG Gypsum Sheathing is a fire-resistant board with a treated, water-resistant gypsum core encased in specially formulated brown water-repellent paper on both sides and long edges. This paper actually sheds water for extra protection in storage and use. Available in two types: 24" wide, 8 ft. length, with V-shaped T&G long edges, normally applied horizontally and 48" wide, 8 and 9 ft. lengths, with square edges. Thickness ½", weight 2,000 lb./MSF.

b. USG Triple-Sealed Gypsum Sheathing is a weather-and fire-resistant board clad in a water-repellent paper on face, back and long edges. Ends are coated with a special waterproofing compound for extra protection that allows outside storage for up to six months in most climates. Thickness .40"; width 48"; lengths 8 and 9 ft.; approx. weight 1,640 lb./MSF.

c. USG Gypsum Liner Panels, for use with the C-H Stud Infill Panel System, have a special fire-resistant gypsum core encased in multilayered moisture-resistant green paper. Thickness 1"; width 24"; lengths to 16 ft., with beveled edges; approx. weight 4,000 lb./MSF.

3. Insulation

a. THERMAFIBER Metal Stud Insulating Blankets are flangeless, open-faced on breather side and made slightly wider than normal to give snug friction fit between studs. These blankets require a separate vapor barrier such as foil-back gypsum panels or base, or a 6-mil polyethylene film. Thickness 3" and 3½"; width 16" and 24"; length 48" and 96".

b. THERMAFIBER Sound Attenuation Blankets are paperless, semi-rigid spun mineral fiber mats, used between studs in the C-H Stud Infill Panel System. Thickness 1½", 2"; width 16" and 24"; length 48".

c. THERMAFIBER Curtain Wall Insulation is a fire-resistant mineral-fiber insulation used in spandrel panels, exterior column covers and other metal-faced wall assemblies. Noncorrosive, offers high thermal efficiency. Regular and foil-faced. Thickness 1", 1½", 2"; width 16" and 24"; length 60".

d. THERMAFIBER Safing Insulation is a semi-rigid mineral fiber felt for installation between concrete floor and spandrel panel. Thickness 2" and 4", width 24"; length 45", 48" or 60".

4. Gypsum Panels

a. Foil-Back SHEETROCK Gypsum Panels have a sheet of bright aluminum foil laminated to the back surface. Panels provide an effective vapor barrier (meet ASTM requirements for a vapor permeability not exceeding 0.30 perm) and significant thermal insulating value when installed with foil back facing studs and a ¾" minimum air space. Thickness ½" and 5/8"; width 48"; length 8 to 14 ft.; approx.

weight 1,745 lb./MSF for $\frac{1}{2}$ ", 2,310 lb./MSF for $\frac{5}{8}$ "; finish is ivory manila paper, suitable for paint or other decoration. Also available in SHEETROCK FIRECODE "C" Panels having specially formulated fire-resistant core for fire-rated construction.

5. Gypsum Base

a. Foil-Back IMPERIAL Gypsum Base is a special product in large panels, designed especially for use with high-strength veneer finishes. It has blue face paper that provides optimum suction for the finishes on the face side and scuff-resistant, bright aluminum foil laminated to the back side. Provides effective vapor barrier (meets ASTM for vapor permeability not exceeding 0.30 perm) and insulation when installed as recommended. Available with Regular or FIRECODE "C" core. Thicknesses of $\frac{1}{2}$ " in Regular and FIRECODE "C"; of $\frac{5}{8}$ " in Regular, FIRECODE and FIRECODE "C"; width 48"; length 8 to 12 ft.; approx. weight 1,915 lb./MSF for $\frac{1}{2}$ ", 2,390 lb./MSF for $\frac{5}{8}$ ".

b. Foil-Back ROCKLATH Plaster Base is a gypsum lath that provides a rigid base for application of standard gypsum plasters. The face has a multi-layered laminated paper designed to provide proper suction and dimensional strength. Bright aluminum foil laminated to the back surface provides a vapor barrier (meets ASTM for vapor permeability not exceeding 0.30 perm) and thermal insulation when lath is correctly installed. Thickness $\frac{3}{8}$ "; width 16"; length 48" or lengths as required; approx. weight 1,430 lb./MSF.

6. Metal Lath

a. 3.4-lb. USG Galvanized Self-Furring Junior Diamond Mesh Lath is a small diamond mesh metal plaster base. The self-furring feature of $\frac{1}{4}$ " "dimple" indentations, spaced $1\frac{1}{2}$ " o.c. each way, makes this lath ideal for reinforcing exterior stucco. Size 27"x96"; weight 3.4 lb./sq. yd.



b. USG Poly-Backed Metal Lath is Junior Diamond Mesh Lath with 1-mil clear polyethylene film factory-bonded to the back. Ideal for machine-applied stucco. Size 27"x96", weight 3.4 lb./sq. yd.

7. Plasters for Interior Surfaces

a. Standard Basecoat Plasters (applied $\frac{7}{16}$ " thick)
(1) RED TOP Gypsum Plaster (100:2).

(2) RED TOP Gypsum Plaster (100:1).
(3) STRUCTO-BASE Gypsum Plaster (100:2).

b. Finish Plasters for Standard Basecoats (applied $\frac{1}{16}$ " thick)

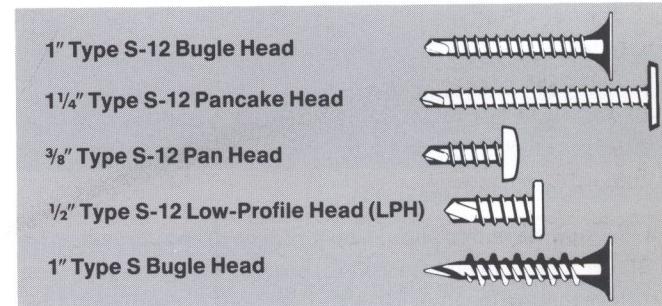
(1) STRUCTO-GAUGE Gauging Plaster and IVORY Lime (1:1 or 1:2).
(2) RED TOP Keenes Cement and IVORY Lime (4:1 or 2:1).
(3) DIAMOND Interior Finish (neat).

c. Veneer Finishes

(1) IMPERIAL Finish Plaster (applied $\frac{1}{16}$ " to $\frac{3}{32}$ " thick in single-coat system).
(2) DIAMOND Interior Finish Plaster (applied $\frac{1}{16}$ " to $\frac{3}{32}$ " thick in single-coat system).
(3) IMPERIAL Basecoat Plaster (applied $\frac{1}{16}$ " to $\frac{3}{32}$ " thick in two-coat system; select finish from (b.) or use c. (1) above.)

8. USG Brand Screws

- a. 1", $1\frac{1}{4}$ ", $1\frac{5}{8}$ " Type S-12 bugle head.
- b. $1\frac{1}{4}$ " Type S-12 pancake head.
- c. $\frac{3}{8}$ " Type S-12 pan head.
- d. $\frac{1}{2}$ " Type S-12 low-profile head (LPH).
- e. 1" Type S bugle head.



9. Lathing Accessories (Standard Plaster)

- a. USG Corner Bead – 1-A, 4-A.
- b. USG Cornerite and Striplath.
- c. USG Casing Bead #66 Expanded Flange.
- d. USG Control Joint #100.
- e. USG Adjustable Wall Furring Bracket.

(Veneer Plaster)

- a. USG Corner Bead 800, 900.
- b. USG Metal Trim #701A, 701B, #801A, 801B.
- c. USG Control Joint #093.
- d. USG Adjustable Wall Furring Bracket.
- e. IMPERIAL Tape for joint reinforcement.

10. Drywall Accessories

- a. Corner Bead – DUR-A-BEAD, #800.
- b. USG Metal Trim – #801A, 801B, #401, #402.
- c. USG Vinyl Trim – P-1, P-2.
- d. USG Control Joint #093.

11. Joint Treatment

- a. PERF-A-TAPE Reinforcement.
- b. Joint Compound:
 - (1) DURABOND Joint Compound – Taping, 90.
 - (2) USG Joint Compound – Taping, Topping, All Purpose.
 - (3) USG Ready-Mixed Joint Compound – Taping, Topping, All Purpose.

12. Materials by Other Manufacturers

a. Portland cement-lime stucco for this assembly should be applied to a full 1" thickness and mixed in accordance with ANSI A42.2, Type L. Proportions: scratch coat – 1 bag cement: $\frac{3}{4}$ to 1 bag BONDCRETE Lime: 5 to 6 cu. ft. sand; brown coat – 1 bag cement: 1 bag lime: 6 to 7 cu. ft. sand.

Magnesium oxychloride cement stuccos or stuccos containing calcium chloride additives should not be used with USG Control Joints and other U.S.G. steel products or accessories.

b. Marblecrete materials as specified by the architect should meet the requirements of local contractors' association and jurisdictional authorities. Stucco, as a bedding material for aggregate, should be applied to a 1" thickness.

c. Masonry materials as specified by the architect should be anchored with corrugated 22-ga. hot-dipped galvanized sheet-steel anchors with sufficient cross-section to withstand 220 lb. without exceeding yield point or breaking mortar bond, or as recommended by the Brick Institute of America.

d. Exterior panels (see p. 11).

e. Runner fasteners should be a power-driven type having 193-lb. single shear and 200-lb. bearing force when driven into structural head or base and without exceeding allowable stress in runner, fastener or structural support. Self-tapping $\frac{1}{2}$ " USG Brand Type S-12 Screws, pan head, may be used for runner attachment to a continuous metal fastening plate embedded in structural concrete. Suitable fastener types are shown in the following table:

runner fasteners⁽¹⁾

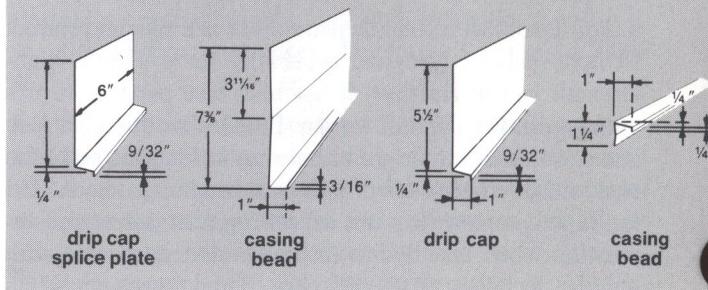
type	size – inches
Power-driven anchors	
For concrete	$\frac{5}{32}$ diam., $1\frac{1}{4}$ long
For steel	$\frac{5}{32}$ diam., $\frac{1}{2}$ long
USG Brand Screws, Type S-12, pan head	$\frac{1}{2}$ long
Threaded bolts and nuts	$\frac{3}{8}$ diam.

(1) See Physical Test Data for proper fastener spacing.

f. Horizontal flashing control joint should consist of two casing beads and a drip cap which together provide a maximum building movement and resistance to wind-

driven water. This joint has effectively resisted air and water penetration under test in wind pressures up to 90 mph. These joints should be fabricated locally to the following shapes and dimensions:

horizontal flashing control joint



g. Sealants – The wall contractor generally seals the junction between interior and exterior finishes, furnishes any sealant required within the wall system and provides for joints which can be adequately sealed by others. The sealant contractor is responsible for sealants at panel and window perimeter. Polyurethane, polysulfide, silicone and certain acrylic-based sealants have been used successfully for curtain walls. Sealant manufacturers should be consulted for specific product and application recommendations.

construction standards

Job Safety – Gypsum drywall, plaster and veneer constructions are usually classed as non-hazardous; but since curtain walls are exterior assemblies sometimes constructed at considerable heights, precautions should be taken to prevent accidents. Consult local, state and federal regulations for details.

Materials Handling – In high-rise buildings, time and money savings can be substantial when proper material-handling and delivery methods are used. Contact your U.S.G. representative for help in developing methods best suited to particular job conditions, and use of freight elevators, hoists or cranes.

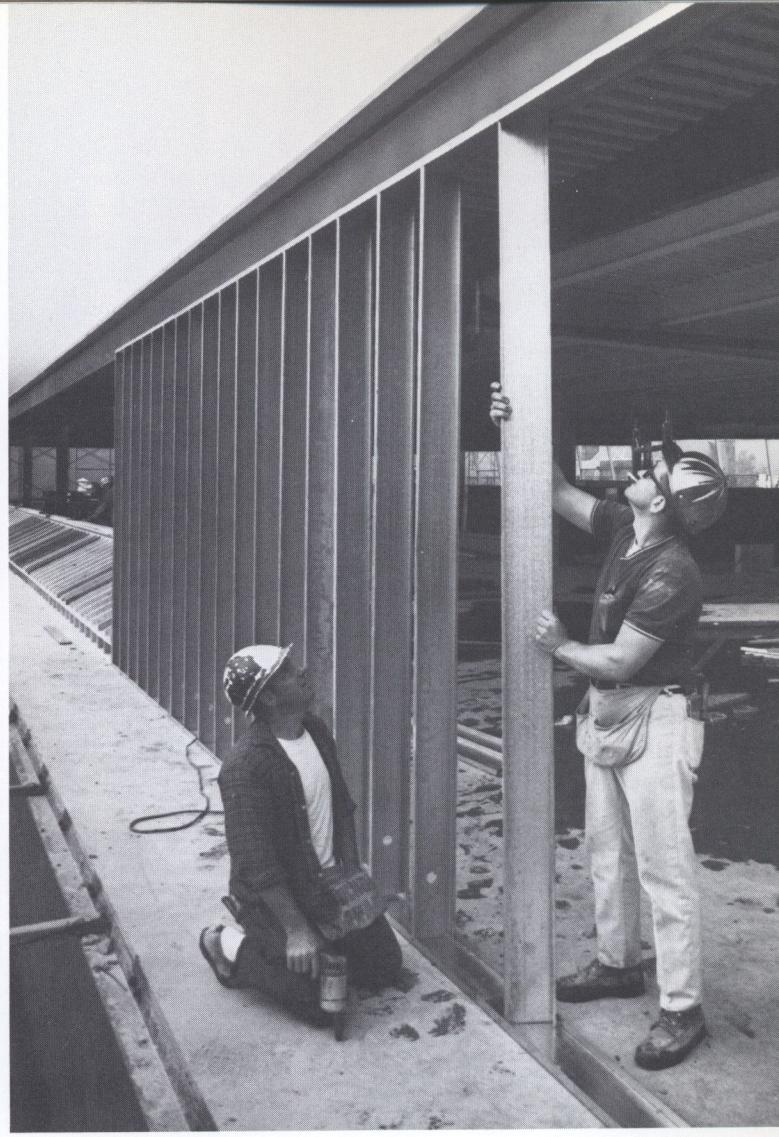
Job Storage – Curtain wall materials should be stored inside under cover and should remain in their wrappings or containers until ready for actual use. Gypsum panels, base and plasters should be stacked flat on a clean floor preferably near the location where they will be used.

Job Conditions – USG Gypsum Sheathing wall assemblies may be erected, as construction schedules require, and used as temporary building enclosures.

When the outdoor temperature is below 55°F., heat should be maintained in the building continuously and uniform-



Attaching ceiling runner



Installing steel studs

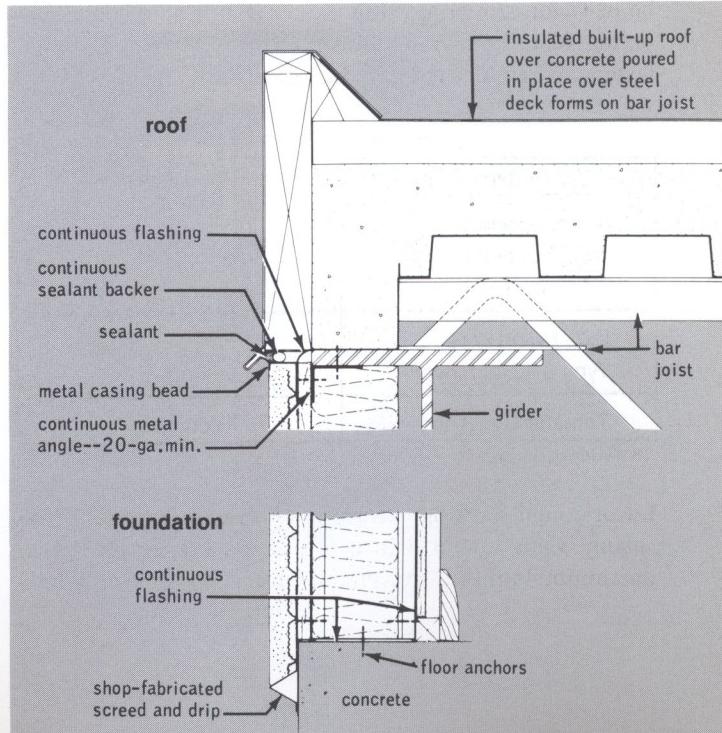
ly at not less than 55°F. from one week prior to beginning of interior installation until gypsum panel and joint finishing or lath and plaster application is completed. Installation should not be started until windows are glazed and doors are installed unless openings are temporarily closed. Adequate ventilation should be provided to eliminate excessive moisture within the building during this period. In hot, dry weather, when fast-drying conditions exist, prevent veneer plaster dryouts by strict adherence to recommendations regarding heat, humidity and ventilation during plaster application.

Advanced Planning can mean savings in time and costs and point the way to the most effective use of materials. By looking ahead to procedures used by the other trades in the job, their effect on the installation of the curtain wall can be foreseen. The job superintendent should appraise the project early and, perhaps, meet with the general contractor to coordinate the work sequence.

System Installation—As described in the following pages, the installation of major components, accessories, joint treatment and other interior products is common to the drywall or lathing and plastering trades.

Stud System Erection

a. Flashing—Before attaching runners, install flashing above top runners and below bottom runners where the system intersects with the structure.



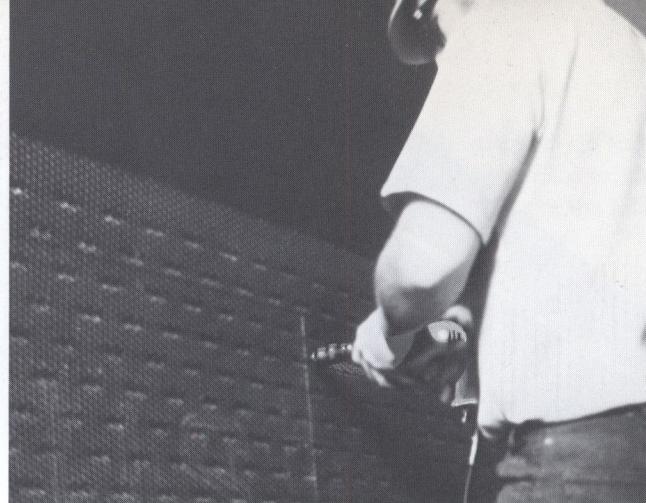
b. USG Steel Stud System—Securely attach USG Steel Runners to base and head with power-driven fasteners placed at runner ends and spaced as specified by the architect. Insert floor-to-ceiling height USG Steel Studs vertically between runners, twisting them into position. Place studs adjacent to door and window frames and at partition intersections, abutting partitions, terminals, columns and corners. Space studs as specified to provide for wind loads, limiting heights and interior finishes. Securely anchor each stud to runners with four $\frac{1}{2}$ " Type S-12 LPH screws, (photo, page 9) two at top and two at bottom with one screw in each flange.

c. USG Light Steel Stud System—Install USG Light Steel Studs and Runners as described above for USG Steel Stud System.

Exterior Lath Installation

a. Self-Furring Lath—Apply metal lath with long dimension across supports, with ends lapped 1" and staggered in adjacent courses, with sides lapped $\frac{1}{2}$ ". Screw-attach lath through sheathing to channel-type steel studs and runners with $1\frac{1}{4}$ " Type S-12 screws spaced 8" o.c. (see photo, above).

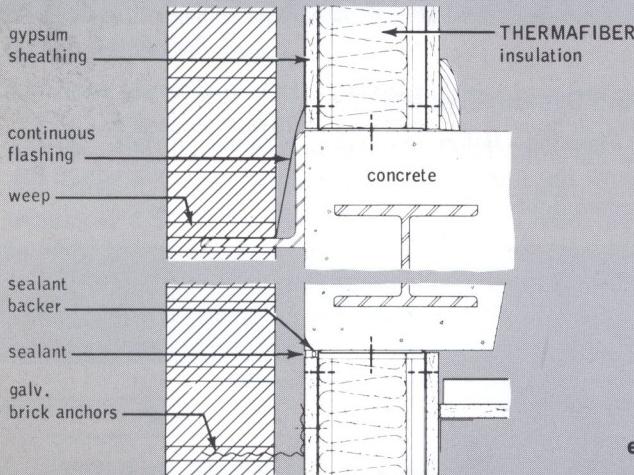
b. Poly-Backed Metal Lath—Apply to steel-stud framing with self-furring fasteners.



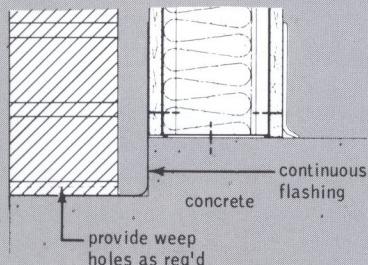
Exterior Accessory Application

a. Control Joints—Install control joints where indicated on architect's drawings (See page 19 for control joint spacing). Break metal lath and gypsum sheathing behind vertical control joints and provide double studs to support each control joint flange. Install a 9" wide No. 15 asphalt felt protection strip between sheathing or lath and control joints. Attach control joints to gypsum sheathing with Bostitch 9/16" Type G staples spaced 6" o.c. in each flange. Splice ends of USG Control Joints together with 16-ga. tie wire inserted into openings in key-lock sections. At intersections of vertical and horizontal joints, use a continuous horizontal flashing control joint and butt the ver-

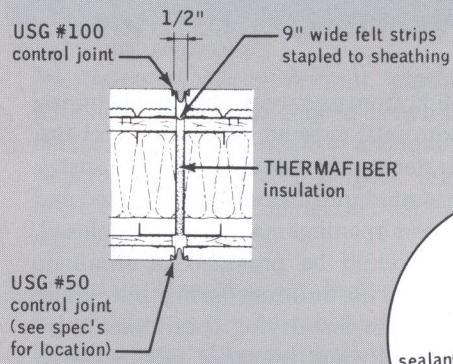
intermediate floor



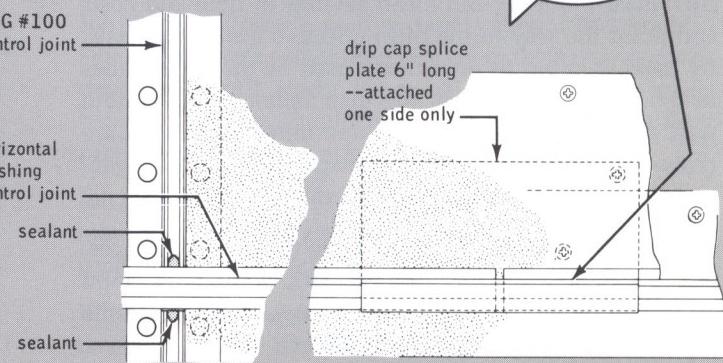
foundation



control joint

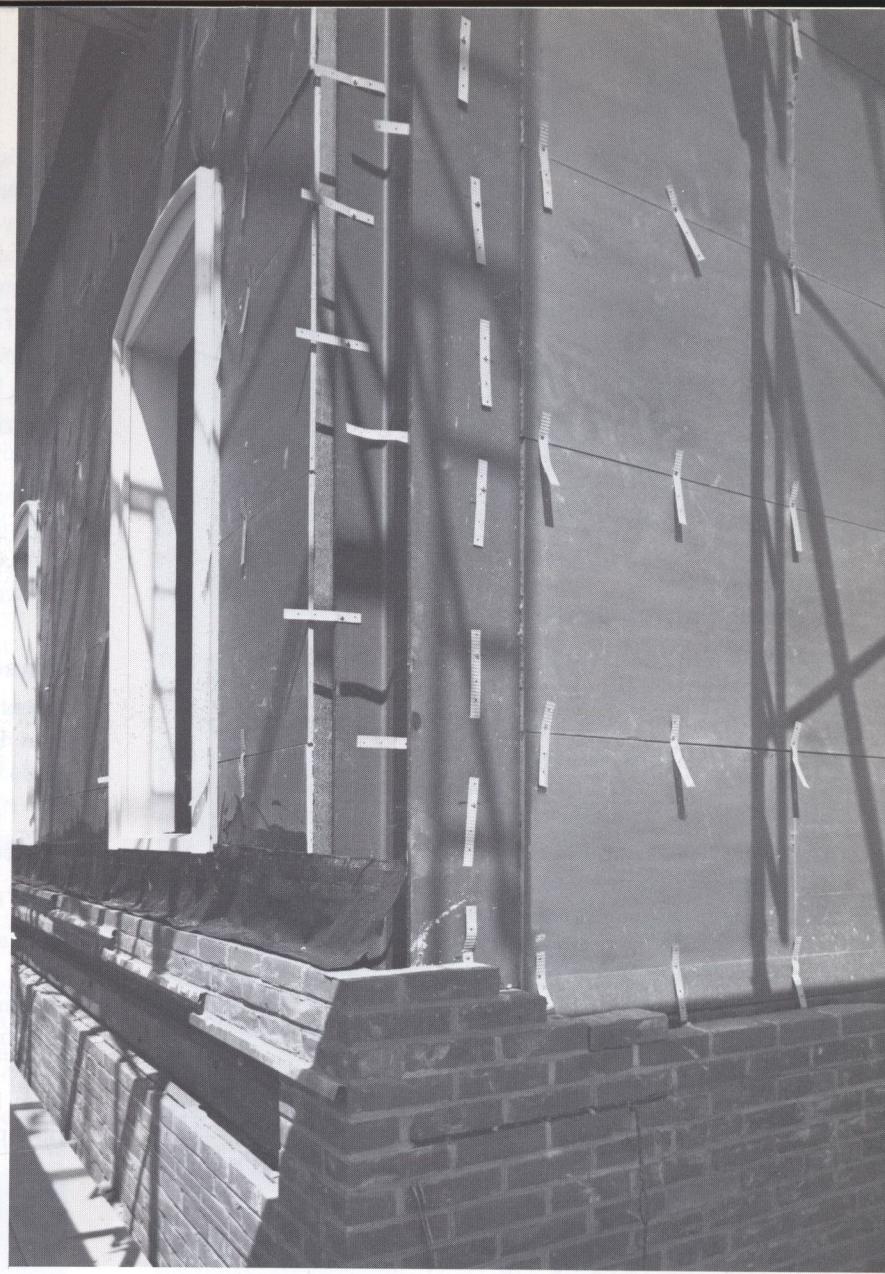


elevation—control joint intersections





Gypsum sheathing screw-attached to channel-type steel studs



Face brick anchored with masonry ties screw-attached to studs

tical joint. Apply sealant at all splices, intersections and terminals. Remove protective tape after plastering.

b. Beads and Trim—Use corner bead, casing bead and trim fabricated from zinc alloy only; do not use galvanized accessories. Provide small weep holes for casing beads installed with the flange up. Fasten beads and trim securely 8" o.c. by stapling to gypsum sheathing or wire-tying to metal lath. Galvanized fasteners may be used.

Masonry Materials Installation

Install masonry per architect's specifications and details. Anchor brick and other masonry veneer to channel-type steel studs with min. 16-ga. hot-dipped galvanized corrugated brick anchors screw-attached to studs with 1 $\frac{1}{4}$ " Type S-12 Pan Head Screws (cadmium-plated). Space anchors vertically 24" o.c. for brick and 16" o.c. for other masonry. Also consult recommendations of Brick Institute of America.

Stucco Application

Apply portland cement-lime stucco in scratch and brown coats to full 1" thickness. Apply scratch coat with sufficient material and pressure to form good full keys on metal lath, then cross-rake. After scratch coat has set firm and hard, apply brown coat to full grounds and straighten to a true surface. Leave rough for finish coat or matrix application or seed aggregate before brown coat has set.

Prefinished Panel Installation

Apply ceramic, aggregated or porcelain enamel panels, prefinished metal siding and other dry exterior facings weighing up to 8 psf over gypsum sheathing and screw-attach to channel-type studs. Use stainless steel or cadmium-plated screws spaced according to panel manufacturer's recommendations. Screws should not transfer more than 15 lbs. panel weight per screw to the studs. Choose screw length based on panel thickness plus $\frac{7}{8}$ ".



THERMAFIBER Blankets installed between studs

Insulation Application

Install THERMAFIBER Metal Stud or Sound Attenuation Blankets between studs. Fit blankets carefully to fill entire height of stud cavity. Attach blankets to gypsum sheathing using 9/16" staples with divergent points placed at each corner and in the center of each blanket, or hold Metal Stud Blankets tightly against metal lath backing with taut horizontal tie wires spaced no more than 36" o.c. Install a separate vapor barrier such as foil-back gypsum panels or base when using stud blankets.

Install THERMAFIBER Curtain Wall Insulation either by press-fitting or attaching mechanically. Install foil-faced blankets with foil facing inward. Butt ends and edges to fill all voids.

Install THERMAFIBER Safing Insulation by inserting on support brackets or impaling on clips 24" o.c., leaving no voids.

Gypsum Drywall Interior Installation

a. Standard Construction—Use Foil-Back SHEETROCK Gypsum Panels positioned vertically or horizontally and attach to studs with 1" Type S-12 screws spaced 8" o.c.

b. Furred Interior Construction—Use regular SHEETROCK Gypsum Panels positioned vertically or horizontally and attach to studs with 1" Type S-12 screws 8" o.c. Over the first panel apply USG Metal Furring Channels horizontally 24" o.c. and screw-attach through panel into metal studs. Attach each channel attachment flange to each stud with 1" Type S-12 screws. Screw-attach a second layer of Foil-Back SHEETROCK Gypsum Panels to furring channels with 1" Type S screws spaced 12" o.c.



Gypsum panel attachment to steel studs

c. Chase Wall Interior Construction—Space gypsum panels for steel stud cross braces not to exceed 48" o.c. vertically. Screw-attach gypsum braces to stud webs with three Type S-12 screws or screw-attach steel stud and runner braces with $\frac{3}{8}$ " Type S-12 screws. Apply Foil-Back SHEETROCK Gypsum Panels to interior stud row (below, left) with 1" Type S screws spaced 12" o.c.

Standard Lath and Plaster Interior Application

Steel Stud Framing—Apply Foil-Back ROCKLATH Plaster Base face out with long dimension across studs. Butt ends together over studs with joints staggered in successive courses. Attach to steel studs with 1" Type S-12 screws spaced 8" o.c., at least $\frac{3}{8}$ " from ends and edges.

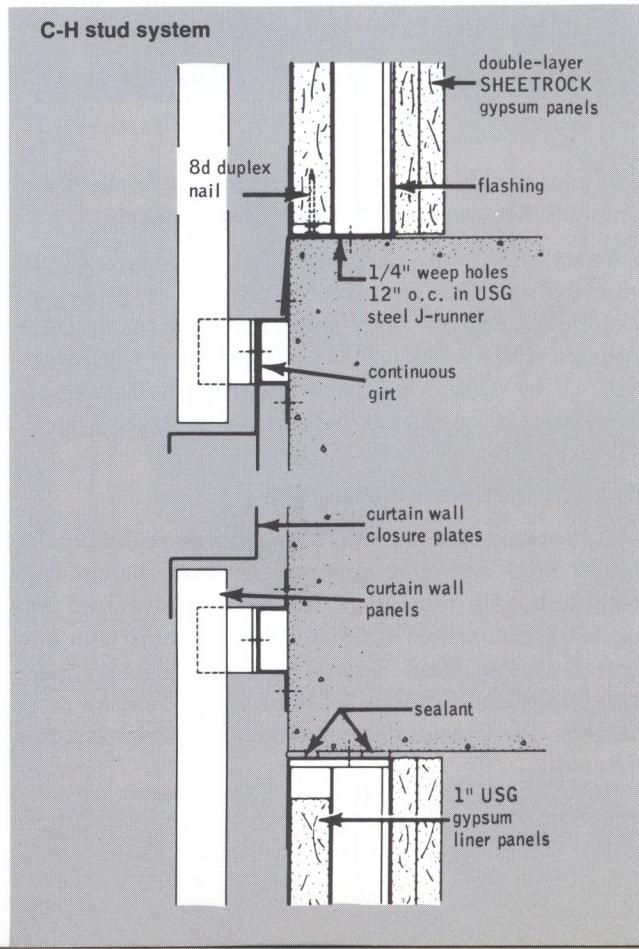
Veneer Finish Interior Application

Direct Attachment—Apply Foil-Back IMPERIAL Gypsum Base vertically or horizontally and attach to steel studs with 1" Type S-12 screws spaced 8" o.c.

special applications

USG C-H Stud Infill Panel System

This system uses USG C-H Studs, J-Runners and Gypsum Liner Panels to provide a sturdy, quickly erected framing system for curtain walls. Prefinished exterior panels are attached after framing and gypsum liner panels are in place. All components except curtain wall skin are erected from inside the building. Building is enclosed as soon as liner panels are installed so interior work can proceed.



Position USG Steel J-Runners at floor and ceiling with short leg toward inside of wall and attach to concrete spandrels with power-driven fasteners 16" o.c. Weep holes in J-Runners allow moisture to drain from channel. Use flashing on floor runners only; install ceiling runners in bed of sealant. Cut USG Shaft Wall Liner Panels 1" less than floor-to-ceiling height to allow tilting into place, then drive two 8d Duplex nails into bottom of each panel about 4" from edges. Nails act as spacers between bottom of panel and runner to prevent wicking of moisture into panel. Install first panel, position C-H Stud on free end of panel and continue alternate panel and stud application to complete wall. Where walls exceed 14 ft. in height, position liner panel end joints within the upper and lower third points of wall. Stagger joints top and bottom in adjacent panels to prevent a continuous horizontal joint.

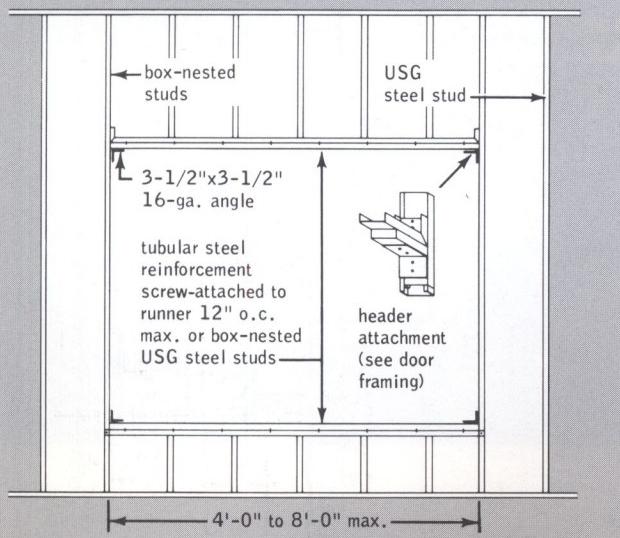
Fasten horizontal girts to structure for anchoring curtain wall panels. Dead load of curtain wall skin must be supported by spandrel beams. If framing is expected to carry the full wind load, this load can be transmitted from curtain wall panels to girts located at $\frac{1}{4}$ points and screw-attached to C-H Stud framing.

Windows

With the wide variety of types and sizes of windows and window walls in use today, complete coverage of all situations is too complex for this handbook. The framing and installation procedures shown are suggestions to be used in design. Specific constructions should be checked for structural adequacy and details reviewed with window suppliers.

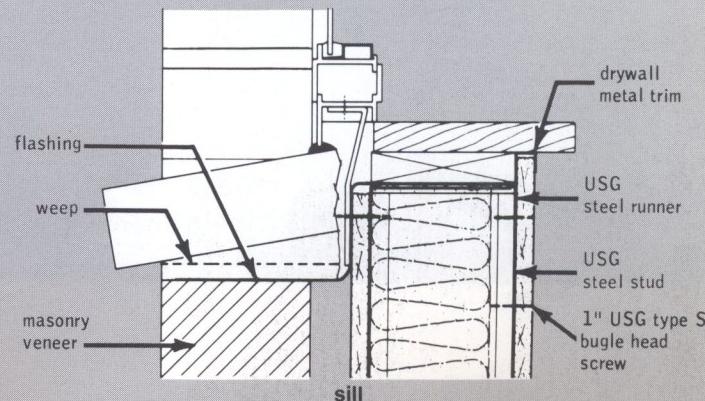
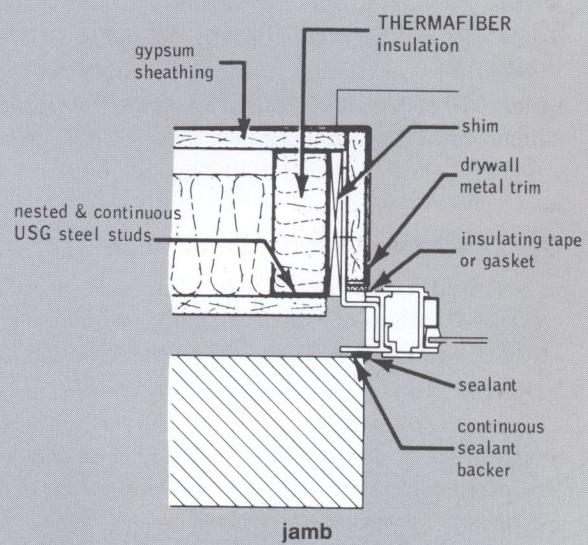
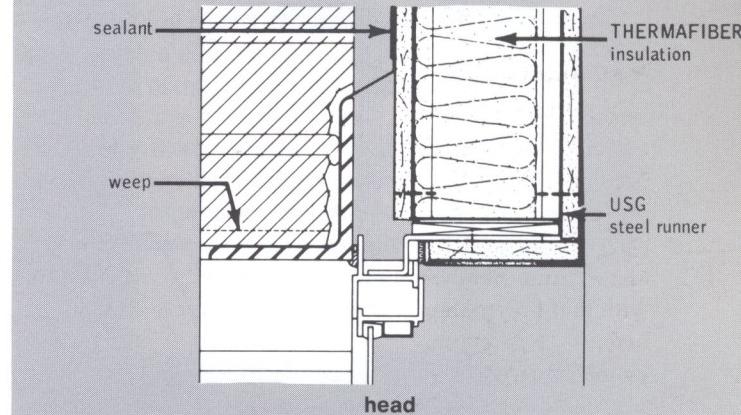
Openings for windows should be accurately framed with allowance for interior finish including corner bead and trim plus adequate tolerance for sash installation. When self-tapping screws are used for window anchorage, a 14-ga. sheet metal plate should be fastened to the framing at jambs, head and sill.

wall elevation – window opening



Channel-type Stud Systems—Install two floor-to-ceiling height studs nested into a box form on each side of window frames. At the head and sill, install framing of channel-type runners for openings up to 4 ft.; boxed channel-type studs in addition to runner for openings 4 to 8 ft.; and tubular girt plus runner for openings 8 ft. or more in width. Cut runner long enough to provide minimum 2" end flanges for attachment. Fasten runner to jamb framing with at least four $\frac{1}{2}$ " Type S-12 LPH screws per flange.

window frame sections

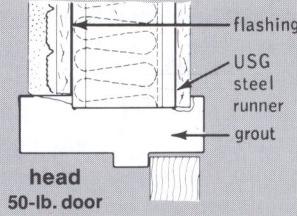
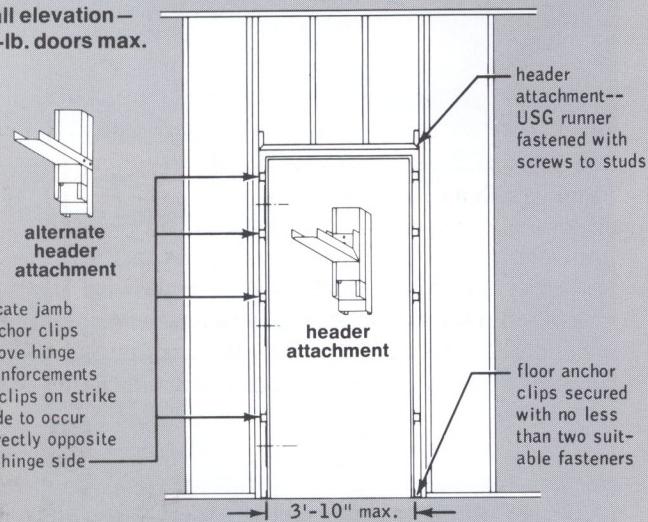


Door Frames

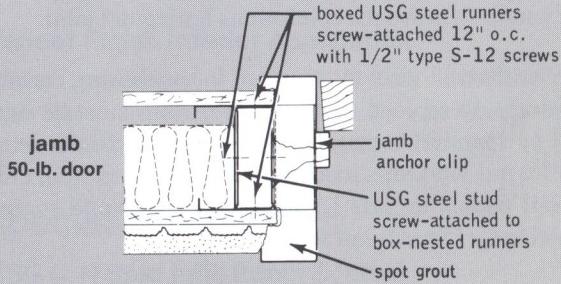
Channel-type Stud Systems—Install two floor-to-ceiling height runners nested into a box form in addition to studs on each side of door frame to act as strut-studs. At the head, install channel-type runner for openings up to 3'-10"; boxed studs in addition to runner for openings up to

7'-10" max.; and tubular structural girts for openings 7'-10" or more in width. Cut runner long enough to provide minimum 2" end flanges for attachment. Fasten runner to strut studs with at least four 1/2" Type S-12 LPH Screws per flange.

wall elevation—
50-lb. doors max.



For details on 50- to
200-lb. doors, see
U.S.G. Technical
Folder SA-805.

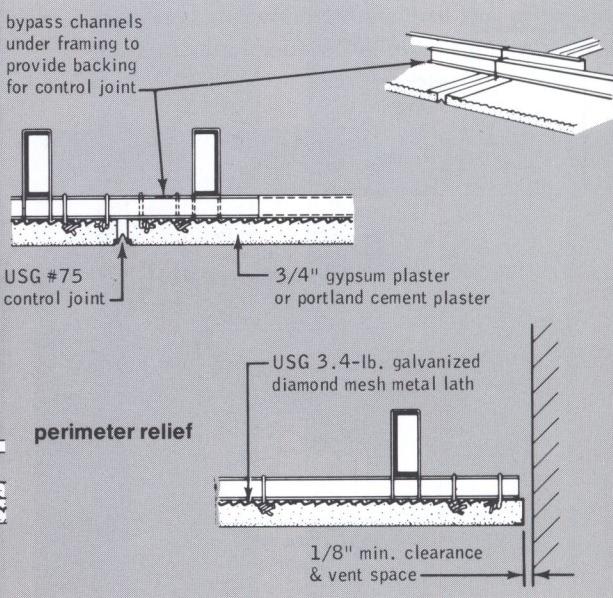
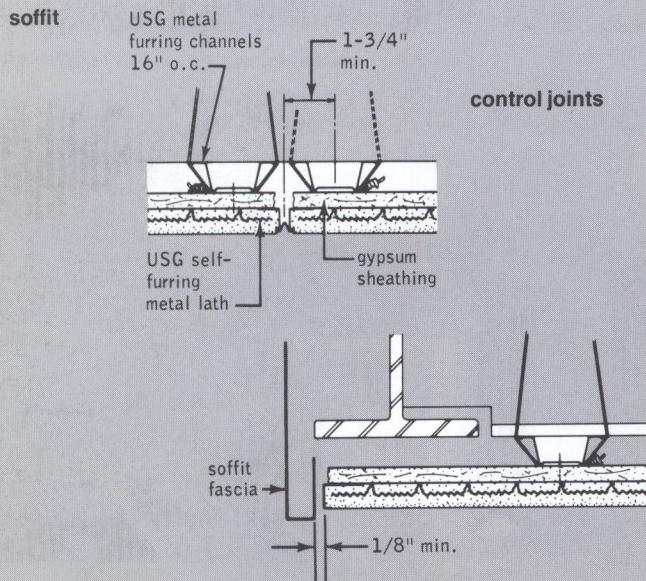


Soffits

Space metal furring or supports for metal lath 16" o.c. max. Apply metal lath with long dimension across supports, with ends lapped 1" and staggered in adjacent courses, sides lapped 1/2". Fasten poly-backed lath to supports with 18-ga. galvanized tie wire spaced 6" o.c. Screw-attach self-furring metal lath through gypsum sheathing to metal furring channels with 1 1/4" Type S-12 Screws spaced 6" o.c.

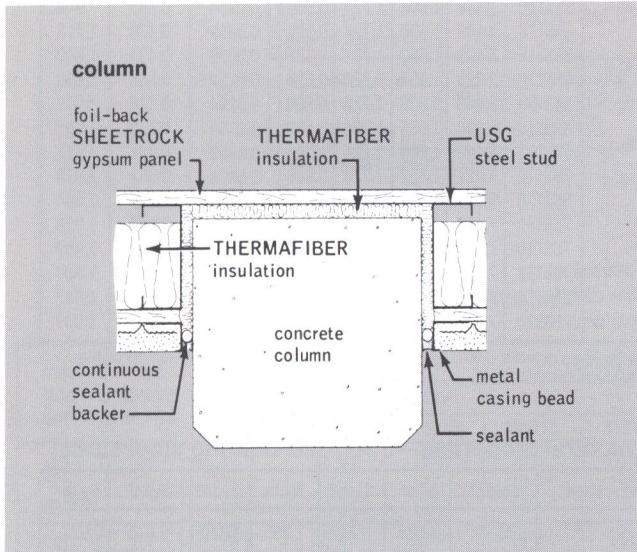
Provide perimeter relief where the soffit abuts a structural element, wall or other vertical penetration. Install control joints spaced 10 ft. in either direction. Break lath and supports behind control joints. Apply portland cement-lime plaster in three coats to 5/8" thickness.

If soffitt is protected from wetting and direct exposure to the weather, gypsum plaster or USG Exterior Gypsum Ceiling Board may be used.



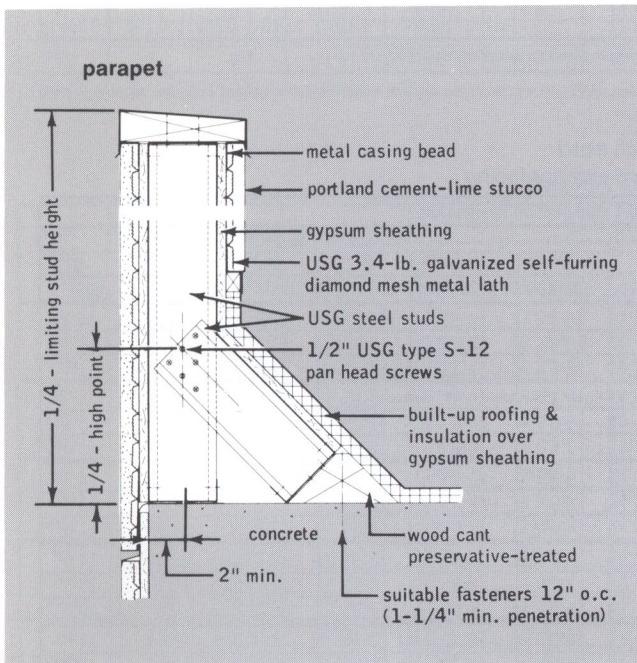
Columns

Isolate curtain wall construction from steel and concrete columns with insulating blankets or pad of other compressible material.



Parapet Walls

Construct parapet walls with exterior surfaces on both sides of framing. Parapet height should be no more than one-fourth the limiting stud height. Metal coping and flashings should be tightly sealed to prevent leakage into the curtain wall cavity.



Prefabrication

In some instances, it is possible to partially fabricate curtain wall panels before erection to save construction time and scaffold erection. Work can be done on or off the site.

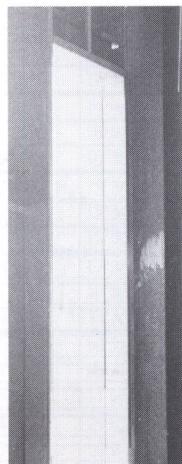
Construct a jig to position and hold components, then position 10-ft. lengths of USG Steel Runner at the top and bottom. Insert floor-to-ceiling-height USG Steel Studs and anchor with low-profile head screws—two at top, two at bottom.

Apply USG Gypsum Sheathing horizontally and screw-attach to exterior of each stud. To compensate for deflection of spandrel beams and to fill gap at top and bottom of panel, attach a continuous metal angle to runners to close off openings of up to 1½ in. between panel and framing.

Tilt sections into place and anchor as required. If suitable hoist equipment is available, panels can be lifted into position and shimmed along bottom runners. See U.S.G. Technical Folder SA-805 for complete installation details.



Jig is used to position and hold components for assembly



Curtain wall sections slip firmly and easily into place

physical test data

fire-rated assembly

fire rating	description and test references
2 hrs.	3½" USG Steel Studs 16" o.c., portland cement-lime stucco exterior applied over ½" gypsum sheathing and reinforced with self-furring lath, 3" THERMAFIBER Metal Stud Insulating Blankets in stud cavity, and ⅛" thick Foil-Back SHEETROCK FIRECODE "C" Gypsum Panels or IMPERIAL FIRECODE "C" Plaster Base and IMPERIAL Plaster interior finish—T-4851-OSU.

physical properties—USG steel studs

stud system	dimension				metal thickness t(1)	net area sq. in.(2)	avg. wt. lb. per MLF(3)
	A	B	C	D			
20ST10	2"	1.250	1.406	0.438	0.0354	0.187	643
212ST10	2½"	1.250	1.406	0.438	0.0354	0.205	704
30ST10	3"	1.250	1.406	0.438	0.0354	0.223	767
358ST10	3½"	1.250	1.406	0.438	0.0354	0.245	844
40ST10	4"	1.250	1.406	0.438	0.0354	0.259	891
60ST10	6"	1.250	1.406	0.438	0.0354	0.331	1.140

(1) Min. thickness including G-60 (.001") galvanized coating. (2) Excluding galvanized coating.
(3) Average net shipping weight.

structural properties—USG steel studs

stud system	stud (1)	I _x in ⁴	S _x in ³	R _x in	I _y in ⁴	S _y in ³	R _y in
20ST10	0.126	0.123	0.820	0.048	0.054	0.510	
212ST10	0.210	0.164	1.012	0.052	0.055	0.507	
30ST10	0.320	0.209	1.197	0.055	0.056	0.501	
358ST10	0.497	0.269	1.422	0.056	0.056	0.493	
40ST10	0.626	0.307	1.553	0.057	0.057	0.487	
60ST10	0.864	0.396	2.076	0.060	0.057	0.463	

(1) Maximum allowable flexural stress: 20,000 psi.

physical properties—USG load-bearing steel studs

stud system	dimension				metal thickness t(1)	net area sq. in.(2)	avg. wt. lb. per MLF(3)
	A	B	C	D			
35ST8	3.448	1.606	1.724	0.500	0.0294	0.217	799
35ST10	3.448	1.606	1.724	0.500	0.0354	0.262	948
35ST13	3.448	1.606	1.724	0.500	0.0459	0.338	1,218
35ST16	3.421	1.552	1.724	0.625	0.0608	0.453	1,600
35ST20	3.421	1.552	1.724	0.625	0.0757	0.558	1,969
55ST8	5.448	1.606	1.724	0.500	0.0294	0.278	1,013
55ST10	5.448	1.606	1.724	0.500	0.0354	0.335	1,202
55ST13	5.448	1.606	1.724	0.500	0.0459	0.461	1,551
55ST16	5.421	1.552	1.724	0.625	0.0608	0.587	2,018
55ST20	5.421	1.552	1.724	0.625	0.0757	0.725	2,504
75ST8	7.448	1.606	1.724	0.500	0.0294	0.334	1,226
75ST10	7.448	1.606	1.724	0.500	0.0354	0.404	1,457
75ST13	7.448	1.606	1.724	0.500	0.0459	0.524	1,880
75ST16	7.421	1.552	1.724	0.625	0.0608	0.707	2,447
75ST20	7.421	1.552	1.724	0.625	0.0757	0.875	3,039

(1) Min. thickness including G-60 (.001") galvanized coating. (2) Excluding galvanized coating.

(3) Average net shipping weight.

structural properties—USG load-bearing steel studs

stud system	stud (1)	I _x in ⁴	S _x in ³	R _x in	I _y in ⁴	S _y in ³	R _y in
35ST8	0.422	0.242	1.395	0.085	0.075	0.627	
35ST10	0.506	0.291	1.391	0.101	0.088	0.620	
35ST13	0.649	0.372	1.385	0.125	0.110	0.609	
35ST16	0.835	0.478	1.358	0.167	0.151	0.606	
35ST20	1.017	0.582	1.349	0.195	0.176	0.591	
55ST8	1.222	0.445	2.098	0.100	0.079	0.601	
55ST10	1.469	0.535	2.094	0.119	0.094	0.595	
55ST13	2.032	0.738	2.097	0.156	0.127	0.607	
55ST16	2.478	0.898	2.079	0.207	0.164	0.607	
55ST20	3.039	1.101	2.070	0.254	0.201	0.599	
75ST8	2.570	0.686	2.772	0.110	0.082	0.573	
75ST10	3.092	0.825	2.767	0.130	0.097	0.567	
75ST13	3.986	1.063	2.758	0.162	0.121	0.557	
75ST16	5.267	1.401	2.730	0.220	0.168	0.558	
75ST20	6.467	1.720	2.718	0.260	0.198	0.545	

(1) Maximum allowable flexural stress: 20,000 psi.

exterior curtain wall stud

limiting heights with interior and exterior facing

wind load (psf)	stud spacing (in o.c.)	limiting height ⁽¹⁾ for steel stud-section designation									
		STUCCO EXTERIOR					MASONRY EXTERIOR				
		2"	2½"	3"	3½"	4"	6"	2"	2½"	3"	3½"
15 (75 mph)	12	12'0"	13'6"	15'9"	16'6"	17'6"	21'6"	10'3"	10'9"	11'6"	12'3"
	16	10'6"	12'3"	13'9"	15'9"	16'6"	20'3"	10'0"	10'6"	11'0"	11'9"
	24	8'6"	10'0"	11'3"	12'9"	13'9"	17'0"	8'6"	9'3"	9'9"	10'3"
20 (85 mph)	12	10'6"	12'3"	13'9"	15'0"	16'0"	19'6"	10'3"	10'9"	11'6"	12'3"
	16	9'0"	10'9"	11'9"	13'6"	14'6"	18'0"	9'0"	10'6"	11'0"	11'9"
	24	7'6"	8'9"	9'9"	11'0"	11'9"	14'9"	7'6"	8'6"	9'9"	10'3"
25 (95 mph)	12	9'3"	11'0"	12'3"	14'0"	14'9"	18'0"	9'3"	10'9"	11'6"	12'3"
	16	8'0"	9'6"	10'6"	12'3"	13'0"	16'0"	8'0"	9'3"	10'6"	11'9"
	24	6'6"	7'9"	8'6"	10'0"	10'6"	12'0"	6'6"	7'9"	8'6"	9'9"
30 (105 mph)	12	8'6"	10'0"	11'3"	12'9"	13'9"	17'0"	8'6"	9'9"	11'3"	12'3"
	16	7'6"	8'9"	9'9"	11'0"	11'9"	14'9"	7'6"	8'6"	9'9"	11'0"
	24	6'0"	7'0"	7'9"	9'0"	9'9"	10'0"	6'0"	7'0"	7'9"	9'0"
35 (115 mph)	12	8'0"	9'3"	10'3"	11'9"	12'9"	15'9"	8'0"	9'3"	10'3"	11'9"
	16	6'9"	8'0"	9'0"	10'3"	11'0"	12'9"	6'9"	8'0"	9'0"	10'0"
	24	5'6"	6'6"	7'3"	8'6"	8'6"	8'6"	5'6"	6'6"	7'3"	8'6"
40 (125 mph)	12	7'6"	8'9"	9'9"	11'0"	11'9"	14'9"	7'6"	8'6"	9'9"	11'0"
	16	6'6"	7'6"	8'3"	9'6"	10'3"	11'3"	6'6"	7'6"	8'3"	9'6"
	24	5'3"	6'3"	6'9"	7'6"	7'6"	7'6"	5'3"	6'0"	6'9"	7'6"

(1) Drywall, plaster and chase wall interior, stucco or masonry exterior. Stress based on capacity of studs alone. Deflection based on composite wall assembly.

heat transfer characteristics – USG steel stud systems

wall type	stud sizes	insulation thickness (in.)	thermal transmittance (1)	
			R	U
Stucco Exterior – Plaster or Drywall Interior	2", 2½", 3", 3½", 3¾", 4", 5½", 6", 7½"	0	4.41	.23
	3½", 3¾", 4", 5½", 6", 7½"	3	15.55	.06
	4", 5½", 6", 7½"	3½	17.81	.06
Masonry Exterior – Plaster or Drywall Interior	2", 2½", 3", 3½", 3¾", 4", 5½", 6", 7½"	0	5.62	.18
	3½", 3¾", 4", 5½", 6", 7½"	3	16.76	.06
	4", 5½", 6", 7½"	3½	19.02	.05

(1) Values based on actual air space thickness.

exterior curtain wall stud

limiting heights with interior and exterior facing
Stucco and Drywall or Plaster

wind load (psf)	stud spacing (in o.c.)	limiting height ⁽¹⁾ for steel stud-section designation											
		3½"					5½"				7½"		
		35ST8	35ST10	35ST13	35ST16	35ST20	55ST10	55ST13	55ST16	55ST20	75ST13	75ST16	75ST20
15 (75 mph)	12	17'0"	18'6"	19'6"	20'0"	20'6"	24'6"	26'3"	27'0"	27'9"	30'9"	32'0"	33'3"
	16	14'9"	16'0"	18'3"	19'6"	19'9"	21'9"	25'3"	26'0"	26'9"	29'6"	30'9"	31'9"
	24	12'0"	13'3"	14'9"	16'9"	17'3"	17'9"	21'0"	22'9"	23'3"	25'0"	26'9"	27'9"
20 (85 mph)	12	14'9"	16'0"	17'9"	18'3"	18'6"	21'9"	23'9"	24'6"	25'3"	28'0"	29'3"	30'3"
	16	12'9"	14'0"	15'9"	17'9"	18'0"	19'0"	22'3"	23'6"	24'3"	26'6"	28'0"	28'9"
	24	10'3"	11'3"	12'9"	14'6"	15'9"	15'0"	18'0"	20'0"	21'3"	20'0"	24'3"	25'0"
25 (95 mph)	12	13'0"	14'6"	16'3"	16'9"	17'8"	19'6"	22'0"	22'9"	23'6"	26'0"	27'0"	28'0"
	16	11'3"	12'6"	14'0"	16'0"	16'9"	17'0"	19'6"	21'9"	22'6"	23'9"	26'0"	26'9"
	24	9'3"	10'3"	11'6"	13'0"	14'6"	12'0"	16'0"	17'9"	19'9"	16'0"	20'0"	23'3"
30 (105 mph)	12	12'0"	13'3"	14'9"	16'0"	16'3"	17'9"	20'9"	21'3"	22'0"	24'6"	25'6"	26'3"
	16	10'3"	11'3"	12'9"	14'6"	15'9"	15'0"	18'0"	20'0"	21'3"	20'0"	24'3"	25'0"
	24	8'3"	9'3"	10'6"	12'0"	13'3"	10'0"	13'3"	16'3"	18'3"	13'3"	16'6"	20'9"
35 (115 mph)	12	11'0"	12'3"	13'9"	15'0"	15'6"	16'6"	19'3"	20'3"	21'0"	22'9"	24'3"	25'0"
	16	9'6"	10'6"	12'0"	13'6"	13'0"	12'9"	16'9"	18'6"	20'0"	17'3"	21'3"	23'9"
	24	7'0"	8'6"	9'9"	11'0"	12'3"	8'6"	11'6"	14'3"	16'9"	11'6"	14'3"	17'9"
40 (125 mph)	12	10'3"	11'3"	12'9"	14'6"	14'9"	15'0"	18'0"	19'6"	20'0"	20'0"	23'0"	24'0"
	16	9'0"	9'9"	11'3"	12'6"	14'0"	11'3"	15'0"	17'3"	19'3"	15'0"	18'9"	22'9"
	24	6'3"	7'6"	9'0"	10'3"	11'3"	7'6"	10'0"	12'6"	15'9"	10'0"	12'6"	15'6"

(1) Limiting criterion: allowable bending stress, deflection or shear, whichever controls. Stress based on capacity of studs alone. Deflection based on composite wall assembly.

Masonry and Drywall or Plaster

wind load (psf)	stud spacing (in o.c.)	limiting height ⁽¹⁾ for steel stud-section designation											
		3½"					5½"				7½"		
		35ST8	35ST10	35ST13	35ST16	35ST20	55ST10	55ST13	55ST16	55ST20	75ST13	75ST16	75ST20
15 (75 mph)	12	15'3"	15'9"	16'6"	17'0"	17'9"	20'3"	21'6"	22'6"	23'9"	26'3"	28'0"	29'6"
	16	14'9"	15'3"	15'9"	16'3"	16'9"	19'3"	20'6"	21'3"	22'3"	24'6"	26'3"	27'6"
	24	12'0"	13'3"	13'9"	14'3"	14'9"	16'9"	17'9"	18'6"	19'6"	21'6"	22'9"	24'0"
20 (85 mph)	12	14'0"	14'3"	15'0"	15'6"	16'0"	18'6"	19'9"	20'6"	21'6"	23'9"	25'6"	26'9"
	16	12'9"	13'9"	14'3"	14'9"	15'3"	17'6"	18'6"	19'3"	20'3"	22'3"	23'9"	25'0"
	24	10'3"	11'3"	12'6"	13'0"	13'3"	15'0"	16'3"	16'9"	17'6"	19'6"	20'9"	21'9"
25 (95 mph)	12	13'0"	13'3"	13'9"	14'6"	15'0"	17'0"	18'3"	19'0"	20'0"	22'0"	23'6"	24'9"
	16	11'3"	12'6"	13'3"	13'9"	14'3"	16'3"	17'3"	18'0"	18'9"	20'9"	22'0"	23'3"
	24	9'3"	10'3"	11'6"	12'0"	12'6"	12'0"	15'0"	15'6"	16'3"	16'0"	19'3"	20'3"
30 (105 mph)	12	12'0"	12'6"	13'0"	13'6"	14'0"	16'0"	17'3"	18'0"	18'9"	20'9"	22'3"	23'6"
	16	10'3"	11'3"	12'6"	13'0"	13'3"	15'0"	16'3"	16'9"	17'6"	19'6"	20'9"	21'9"
	24	8'3"	9'3"	10'6"	11'3"	11'9"	10'0"	13'3"	14'9"	15'6"	13'3"	16'6"	19'0"
35 (115 mph)	12	11'0"	12'3"	13'0"	13'3"	15'3"	16'3"	17'0"	17'9"	19'9"	21'0"	22'3"	22'3"
	16	9'6"	10'6"	11'9"	12'3"	12'9"	12'9"	15'6"	16'0"	16'9"	17'3"	19'9"	20'9"
	24	7'0"	8'6"	9'9"	10'9"	11'0"	8'6"	11'6"	14'0"	14'6"	11'6"	14'3"	17'9"
40 (125 mph)	12	10'3"	11'3"	11'9"	12'3"	12'9"	14'6"	14'6"	15'6"	16'3"	17'0"	19'0"	20'3"
	16	9'0"	9'9"	11'3"	11'9"	12'3"	11'3"	14'9"	15'3"	16'0"	15'0"	18'9"	19'9"
	24	6'3"	7'6"	8'6"	10'3"	10'6"	7'6"	10'0"	12'6"	14'0"	10'0"	12'6"	15'6"

(1) Limiting criterion: allowable bending stress, deflection or shear, whichever controls. Stress based on capacity of studs alone. Deflection based on composite wall assembly.

exterior curtain wall stud
 limiting heights with interior and exterior facing
Sheathing & Drywall

wind load	deflection limitation	stud spacing (in o.c.)	limiting height ⁽¹⁾ for steel stud-section designation											
			3½"					5½"				7½"		
			35ST8	35ST10	35ST13	35ST16	35ST20	55ST10	55ST13	55ST16	55ST20	75ST13	75ST16	75ST20
15 psf (75 mph)	L/120	12	16'0"	16'9"	18'3"	19'9"	21'0"	24'0"	26'6"	28'3"	30'3"	33'3"	36'3"	38'9"
		16	14'6"	15'6"	16'9"	18'0"	19'3"	21'9"	24'3"	25'9"	27'6"	30'3"	33'0"	35'3"
		24	12'0"	13'3"	14'6"	15'9"	16'9"	17'9"	21'0"	22'6"	24'0"	25'0"	28'9"	31'0"
	L/240	12	12'9"	13'6"	14'6"	15'9"	16'9"	19'0"	21'0"	22'6"	24'0"	26'3"	28'9"	30'9"
		16	11'6"	12'3"	13'3"	14'3"	15'3"	17'3"	19'3"	20'6"	22'0"	24'0"	26'3"	28'0"
		24	10'0"	10'9"	11'6"	12'6"	13'3"	15'3"	16'9"	17'9"	19'3"	21'0"	23'0"	24'6"
	L/360	12	11'0"	11'9"	12'9"	13'9"	14'6"	16'6"	18'6"	19'6"	21'0"	23'0"	25'3"	27'0"
		16	10'0"	10'9"	11'6"	12'6"	13'3"	15'3"	16'9"	17'9"	19'3"	21'0"	23'0"	24'6"
		24	8'9"	9'3"	10'0"	11'0"	11'9"	13'3"	14'9"	15'6"	16'9"	18'3"	20'0"	21'6"
20 psf (85 mph)	L/120	12	14'6"	15'3"	16'6"	18'0"	19'3"	21'9"	24'0"	25'9"	27'6"	30'3"	33'0"	35'3"
		16	12'9"	14'0"	15'3"	16'6"	17'6"	19'0"	22'0"	23'3"	25'0"	26'6"	30'0"	32'3"
		24	10'3"	11'3"	12'9"	14'3"	15'3"	15'0"	18'0"	20'0"	22'0"	20'0"	25'0"	27'9"
	L/240	12	11'6"	12'3"	13'3"	14'3"	15'3"	17'3"	19'3"	20'3"	21'9"	24'0"	26'3"	28'0"
		16	10'6"	11'0"	12'0"	13'0"	13'9"	15'9"	17'6"	18'6"	20'0"	21'9"	23'9"	25'6"
		24	9'3"	9'9"	10'6"	11'3"	12'0"	13'9"	15'3"	16'3"	17'6"	19'0"	20'9"	22'3"
	L/360	12	10'0"	10'6"	11'6"	12'6"	13'3"	15'0"	16'9"	17'9"	19'0"	21'0"	23'0"	24'6"
		16	9'3"	9'9"	10'6"	11'3"	12'0"	13'9"	15'3"	16'3"	17'6"	19'0"	20'9"	22'3"
		24	8'0"	8'6"	9'3"	10'0"	10'6"	12'0"	13'3"	14'3"	15'3"	16'9"	18'3"	19'6"
25 psf (95 mph)	L/120	12	13'0"	14'3"	15'6"	16'9"	17'9"	19'6"	22'6"	23'9"	25'6"	27'6"	30'9"	32'9"
		16	11'3"	12'6"	14'0"	15'3"	16'3"	17'0"	19'9"	21'9"	23'3"	23'9"	27'3"	29'9"
		24	9'3"	10'3"	11'6"	13'0"	14'3"	12'0"	16'0"	17'9"	20'0"	16'0"	20'0"	24'9"
	L/240	12	10'9"	11'3"	12'3"	13'3"	14'0"	16'0"	17'9"	19'0"	20'3"	23'3"	24'3"	26'0"
		16	9'9"	10'3"	11'3"	12'0"	12'9"	14'9"	16'3"	17'3"	18'6"	20'3"	22'3"	23'9"
		24	8'6"	9'0"	9'9"	10'6"	11'3"	12'0"	14'3"	15'0"	16'3"	16'0"	19'3"	20'9"
	L/360	12	9'3"	9'9"	10'9"	11'6"	12'3"	14'0"	15'6"	16'6"	17'9"	19'6"	21'3"	22'9"
		16	8'6"	9'0"	9'9"	10'6"	11'3"	12'9"	14'3"	15'0"	16'3"	17'9"	19'3"	20'9"
		24	7'6"	8'0"	8'6"	9'3"	9'9"	11'3"	12'3"	13'3"	14'0"	15'6"	17'3"	18'0"
30 psf (105 mph)	L/120	12	12'0"	13'3"	14'6"	15'9"	16'9"	17'9"	21'0"	22'6"	24'0"	25'0"	28'9"	30'9"
		16	10'3"	11'3"	12'9"	14'3"	15'3"	15'0"	18'0"	20'0"	22'0"	20'0"	25'0"	27'9"
		24	8'3"	9'3"	10'6"	12'0"	13'3"	10'0"	13'3"	16'3"	18'3"	13'3"	16'9"	20'9"
	L/240	12	10'0"	10'6"	11'6"	12'6"	13'3"	15'0"	16'9"	17'9"	19'0"	21'0"	23'0"	24'6"
		16	9'3"	9'9"	10'6"	11'3"	12'0"	13'9"	15'3"	16'3"	17'6"	19'0"	20'9"	22'3"
		24	8'0"	8'6"	9'3"	10'0"	10'6"	10'0"	13'3"	14'3"	15'3"	13'3"	16'9"	19'6"
	L/360	12	8'9"	9'3"	10'0"	10'9"	11'6"	13'3"	14'6"	15'6"	16'9"	18'3"	20'0"	21'6"
		16	8'0"	8'6"	9'3"	10'0"	10'6"	12'0"	13'3"	14'3"	15'3"	16'9"	18'3"	19'6"
		24	7'0"	7'6"	8'0"	8'9"	9'3"	10'0"	11'9"	12'3"	13'3"	13'3"	16'0"	17'0"
35 psf (115 mph)	L/120	12	11'0"	12'3"	13'9"	15'0"	15'9"	16'6"	19'3"	21'3"	22'9"	22'9"	26'9"	29'3"
		16	9'6"	10'6"	12'0"	13'6"	14'6"	12'9"	16'9"	18'6"	20'6"	17'3"	21'6"	25'6"
		24	7'3"	8'6"	9'9"	11'0"	12'3"	8'6"	11'6"	15'0"	16'9"	11'6"	14'3"	17'9"
	L/240	12	9'6"	10'0"	11'0"	11'9"	12'6"	14'3"	16'0"	17'0"	18'3"	19'9"	21'9"	23'3"
		16	8'9"	9'3"	10'0"	10'9"	11'6"	12'9"	14'6"	15'6"	16'6"	17'3"	19'9"	21'3"
		24	7'3"	8'0"	8'9"	9'6"	10'0"	8'6"	11'6"	13'6"	14'6"	11'6"	14'3"	17'9"
	L/360	12	8'3"	8'9"	9'6"	10'3"	11'0"	12'6"	14'0"	14'9"	15'9"	17'3"	19'0"	20'3"
		16	7'9"	8'0"	8'9"	9'6"	10'0"	11'6"	12'9"	13'6"	14'6"	15'9"	17'3"	18'6"
		24	6'9"	7'0"	7'6"	8'3"	8'9"	8'6"	11'0"	11'9"	12'6"	11'6"	14'3"	16'3"
40 psf (125 mph)	L/120	12	10'3"	11'3"	12'9"	14'3"	15'3"	15'0"	18'0"	20'0"	21'9"	20'0"	25'0"	27'9"
		16	9'0"	9'9"	11'3"	12'6"	13'9"	11'3"	15'0"	17'3"	19'3"	15'0"	18'9"	23'6"
		24	6'3"	7'6"	9'0"	10'3"	11'3"	7'6"	10'0"	14'0"	15'9"	10'0"	12'6"	15'9"
	L/240	12	9'0"	9'9"	10'6"	11'3"	12'0"	13'9"	15'3"	16'3"	17'3"	19'0"	20'9"	22'3"
		16	8'3"	8'9"	9'6"	10'3"	11'0"	11'3"	13'9"	14'9"	15'9"	15'0"	18'9"	20'3"
		24	6'3"	7'6"	8'3"	9'0"	9'6"	7'6"	10'0"	12'9"	13'9"	10'0"	12'6"	15'9"
	L/360	12	8'0"	8'6"	9'0"	10'0"	10'6"	12'0"	13'3"	14'0"	15'3"	16'6"	18'3"	19'6"
		16	7'3"	7'9"	8'3"	9'0"	9'6"	11'0"	12'0"	12'9"	13'9"	15'0"	16'6"	17'9"
		24	6'3"	6'9"	7'3"	7'9"	8'6"	7'6"	10'0"	11'3"	12'0"	10'0"	12'6"	15'6"

(1) Exterior is USG Triple-Sealed Gypsum Sheathing, 0.4" thick; interior is ½" SHEETROCK Gypsum Panels. Stress based on capacity of studs alone. Deflection based on composite wall assembly.

exterior curtain wall framing—C-H Studs
limiting heights with interior and exterior facing

wind load	deflection limitation	stud spacing (in o.c.)	limiting height ⁽¹⁾ for steel stud-section designation	
			2½" CH8	4" CH10
15 psf (75 mph)	L/120	12	14'9" (d)	19'3" (d)
		16	12'9" (f)	17'9" (d)
		24	10'6" (f)	15'9" (d)
	L/240	12	11'9" (d)	15'3" (d)
		16	11'0" (d)	14'0" (d)
		24	10'3" (d)	12'6" (d)
	L/360	12	10'3" (d)	13'6" (d)
		16	9'9" (d)	12'3" (d)
		24	9'0" (d)	11'0" (d)
20 psf (85 mph)	L/120	12	12'9" (f)	17'6" (d)
		16	11'0" (f)	16'0" (d)
		24	9'0" (f)	14'0" (v)
	L/240	12	10'6" (d)	14'0" (d)
		16	10'0" (d)	12'9" (d)
		24	9'0" (f)	11'6" (d)
	L/360	12	9'3" (d)	12'3" (d)
		16	8'9" (d)	11'3" (d)
		24	8'3" (d)	10'0" (d)
25 psf (95 mph)	L/120	12	11'6" (f)	16'3" (d)
		16	10'0" (f)	15'0" (d)
		24	8'0" (f)	11'3" (v)
	L/240	12	9'9" (d)	13'0" (d)
		16	9'3" (d)	12'0" (d)
		24	8'0" (f)	10'6" (d)
	L/360	12	8'6" (d)	11'3" (d)
		16	8'3" (d)	10'6" (d)
		24	—	9'3" (d)
30 psf (105 mph)	L/120	12	10'6" (f)	15'3" (d)
		16	9'0" (f)	14'0" (d)
		24	—	9'6" (v)
	L/240	12	9'3" (d)	12'3" (d)
		16	8'9" (d)	11'3" (d)
		24	—	9'6" (v)
	L/360	12	8'0" (d)	10'6" (d)
		16	—	9'9" (d)
		24	—	8'9" (d)
35 psf (115 mph)	L/120	12	9'9" (f)	14'6" (d)
		16	8'6" (f)	12'0" (v)
		24	—	8'0" (v)
	L/240	12	8'9" (d)	11'6" (d)
		16	8'3" (d)	10'6" (d)
		24	—	8'0" (v)
	L/360	12	—	10'0" (d)
		16	—	9'3" (d)
		24	—	8'0" (v)
40 psf (125 mph)	L/120	12	9'0" (f)	14'0" (d)
		16	—	10'6" (v)
		24	—	—
	L/240	12	8'6" (d)	11'0" (d)
		16	—	10'3" (d)
		24	—	—
	L/360	12	—	9'9" (d)
		16	—	8'9" (d)
		24	—	—
45 psf (135 mph)	L/120	12	8'6" (f)	12'6" (v)
		16	—	9'6" (v)
		24	—	—
	L/240	12	8'0" (d)	10'6" (d)
		16	—	9'6" (v)
		24	—	—
	L/360	12	—	9'3" (d)
		16	—	8'6" (d)
		24	—	—
50 psf (145 mph)	L/120	12	8'0" (f)	11'3" (v)
		16	—	8'6" (v)
		24	—	—
	L/240	12	—	10'3" (d)
		16	—	8'6" (v)
		24	—	—
	L/360	12	—	9'0" (d)
		16	—	8'3" (d)
		24	—	—

Limiting criteria: (f) bending stress; (d) deflection; (v) end reaction.

(1) Any exterior treatment; interior is two layers of ½" SHEETROCK Gypsum Panels. Stress based on capacity of studs alone. Deflection based on composite wall assembly.

problems and remedies

1. Shadowing and Spotting—During periods of low outside temperature, condensation may form on outside walls, collecting airborne dirt to produce shadowing and spotting over fasteners and furring. This is a natural phenomenon which occurs through no fault in the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternates should be considered:

a. Furred Wall—Foil-Back SHEETROCK Panels used for interior facing should be furred from studs using a base layer of regular gypsum panels screw-attached to studs and horizontally applied USG Metal Furring Channels.

b. Chase Wall—For maximum resistance to shadowing and spotting, a separate chase wall construction is recommended using studs that are independent of exterior studs and membrane.

2. Expansion and Contraction—Curtain wall surfaces should be isolated with control joints or other means where: **(a)** curtain wall abuts a structural element (except floor) or dissimilar wall or ceiling; **(b)** construction changes within the plane of the wall; **(c)** stucco surfaces exceed 10 ft. in either direction; **(d)** the area within stucco sections exceeds 100 sq. ft.; **(e)** the basic construction contains a control joint; **(f)** interior partition run exceeds 30 ft. Ceiling-height door and window frames may be used as control joints, as may less-than-ceiling height frames if control joints extend to the ceiling and floor from both corners.

Sheathing should be broken behind control joints. Where vertical and horizontal joints intersect, the horizontal joint should be continuous and the vertical joint should abut it. Splices, terminals and intersections should be caulked with a sealant.

3. Air and Water Infiltration—Flashing and sealants as shown in the details should be provided to resist air and water infiltration. Accessories for stucco finishes should be made of zinc alloy with weep holes 12" o.c. In high-wind areas where moisture may penetrate porous stucco and masonry surfaces, a water-resistive barrier should be applied over the gypsum sheathing. Poly-backed metal lath may be used.

4. Stucco-type materials containing magnesium oxychloride or calcium chloride are not recommended for use with USG Control Joints made of zinc alloy or other U.S.G. metal accessories.

Note: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.



UNITED STATES GYPSUM

BUILDING AMERICA

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SA

805

USG curtain wall systems

for design flexibility, tested performance
and architectural beauty

system folder

8.14/Un

UNITED STATES GYPSUM
CURTAINWALL SYSTEM
metal stud & facings

1976-1

8 P

On cover:
UNIV. OF SOUTH CAROLINA, AIKEN REGIONAL CAMPUS, Aiken, S.C.
Architect: LBC & W OF SOUTH CAROLINA

210 NORTH IRONWOOD DRIVE BUILDING, South Bend, Ind.
Architect: MATHEWS, PURUCKER & ASSOC., AIA



UNION COUNTY COURTHOUSE, Monroe, N.C.
Architect: HENNINGSON, DURHAM & RICHARDSON, INC., AIA



UNIV. OF WASHINGTON INTRAMURAL BUILDING, Seattle, Wash.
Architect: ROBERT BILLSBOROUGH PRICE & ASSOC., AIA



...lightweight framing systems for exterior walls (non-load bearing)

description

USG Exterior Curtain Wall Systems offer a wide range of effects for non-load bearing exterior walls. Utilizing conventional materials, methods and equipment, plus trades already on the job, these improved systems have been specified in all parts of the nation.

framing systems

USG Steel Studs, modified channel types roll-formed from five thicknesses of galvanized steel, provide the wall framing with both interior drywall and veneer plaster systems. They are an ideal back-up for brick veneer assemblies, reducing dead load 25% in comparison to concrete block backings. Studs are available in nine depths, five thicknesses, giving a variety of sizes. The wide choice of stud sizes and spacings accommodates wall heights to 33'-3", wind loads to 40 psf, and a variety of building modules.

Studs are anchored at top and bottom in specially designed runners, and THERMAFIBER Insulation is inserted in the cavity between studs.

For data on truss-type framing used with these systems, see U.S.G. Technical Bulletin PM-149 on "TRUSSSTEEL Stud Curtain Wall System."

exterior surfaces

Exterior surfaces may be brick veneer, portland cement-lime stucco or various decorative panels or siding materials.

Face or common brick or other masonry units, 4" thick, are laid with portland cement-lime mortar and secured with wall ties, spaced 24" o.c. vertically, and screw-attached through the sheathing to steel studs. This system offers speedier building enclosure, superior weather protection of a double-cavity wall and greater variety of insulation options.

Portland cement-lime stucco is applied in three coats to a 1" thickness over 3.4-lb. galvanized metal lath. Self-furring metal lath is screw-attached through ½" USG Gypsum Sheathing to steel studs.

Ceramic, aggregated or porcelain-enameded panels, prefinished metal siding and other dry exterior facings weighing up to 8 psf are applied over gypsum sheathing and screw-attached to studs.

interior surfaces

Interior surfaces may be gypsum drywall, high-strength veneer plaster or conventional plaster. Hundreds of variations in finishes ranging from smooth trowel to oriental-style textures, painted or fabric-covered, are available for interior design.

With *gypsum drywall*, Foil-Back SHEETROCK Gypsum Panels, ½" or ⅝" thick, are screw-attached to the steel studs. Foil-Back SHEETROCK FIRECODE Gypsum Panels provide additional resistance to fire exposure, are used in assemblies where a fire rating is required.

Veneer plaster interiors have Foil-Back IMPERIAL Gypsum Base screw-attached to steel studs. IMPERIAL Plaster or DIAMOND Interior Finish is applied ⅛" to ⅜" thick over this large-size base.

For *conventional plaster* interiors, Foil-Back ROCKLATH Plaster Base is clip or screw-attached to studs and RED TOP Gypsum Plaster is applied ½" thick over the base.

function and utility

USG Curtain Wall Systems adapt easily to basic design concepts and may be used as vertical spandrels or infill panels and in ledger-supported systems. They are suitable for many types of structures such as office buildings, schools, shopping centers, motels, hotels and apartments.

Design Freedom—Exterior stucco surfaces for this framing offer unlimited opportunity for creative design through the

textural expression of smooth monolithic surfaces or random sculptural relief. Color and texture can be varied by the addition of coarse, colored aggregates which contrast boldly with brick, glass and concrete. The great range of possibilities allows the architect a wide latitude of design expression.

Versatility—Interior and exterior facings in various combinations offer the architect and owner a greater selection of surface finishes to meet specific functional and esthetic needs.

Fire Resistance—2-hour rating available (see table).

Sound Control—The dampening effect of air space and insulation within the framing reduces the airborne street noise transmitted to the interior.

Thermal Insulation—High thermal performance meets the "All-Weather Comfort Standard" for electrically heated and air conditioned buildings (see page 10 for specific heat transfer characteristics).

Light Weight—These systems reduce dead load by 25% in brick masonry walls and up to 66% in textured panel assemblies, thus reducing structural requirements in foundations and footings.

Weather Resistance—Confirmed by tests, the systems meet air and water infiltration standards set by HUD and NAAMM for 40 psf wind pressure which is equivalent to a wind velocity of 125 mph. Where moisture may penetrate stucco and masonry exteriors, a weather-resistive barrier over gypsum sheathing may be required for additional protection.

Adaptability—USG Curtain Walls can be used in most types of steel or reinforced concrete constructions in which the load is borne by the structural framing and not imparted to the curtain wall.

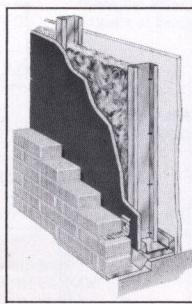
Economy—No new or unusual materials or techniques are required. All components and applications procedures are familiar to mechanics.

limitations

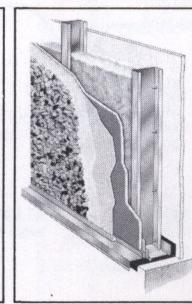
1. Non-load bearing constructions.
2. Limiting heights, maximum stud and runner attachment spacing for up to 40 psf wind loading are shown in Technical Data, pages 8 and 9.
3. Certain recommendations covering shadowing and spotting, expansion and contraction, air and water infiltration must be followed for satisfactory performance of USG Curtain Wall Systems (see Specifications, page 10).

fire rating

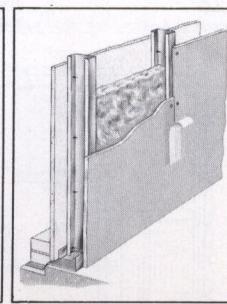
description	test no.	fire rating
358ST10 steel studs 16" o.c.—½" gypsum sheathing—self-furring metal lath—1" cement-lime stucco exterior—3" THERMAFIBER metal stud blankets between studs—⅝" Foil-Back SHEETROCK FIRECODE "C" gypsum panels or IMPERIAL FIRECODE "C" gypsum base and ⅛" IMPERIAL plaster interior	T-4851-OSU	2 hrs.



masonry exterior



aggregated panel exterior



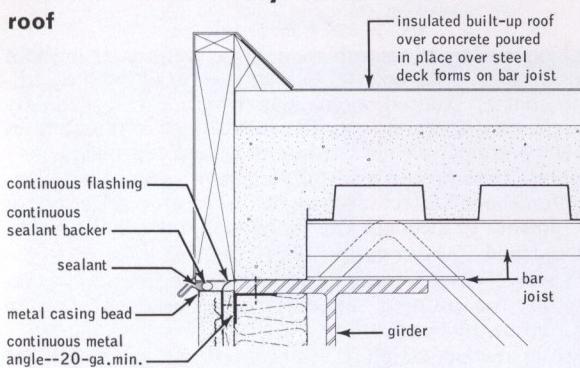
gypsum drywall interior

details

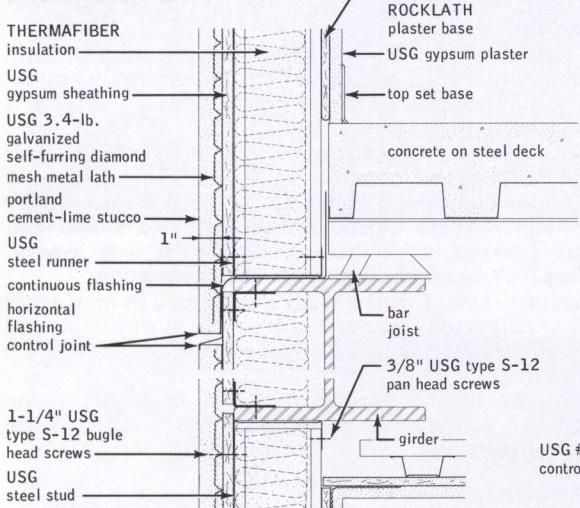
scale: $1\frac{1}{2}'' = 1'-0''$

exterior stucco/steel frame

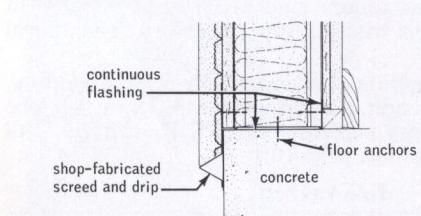
roof



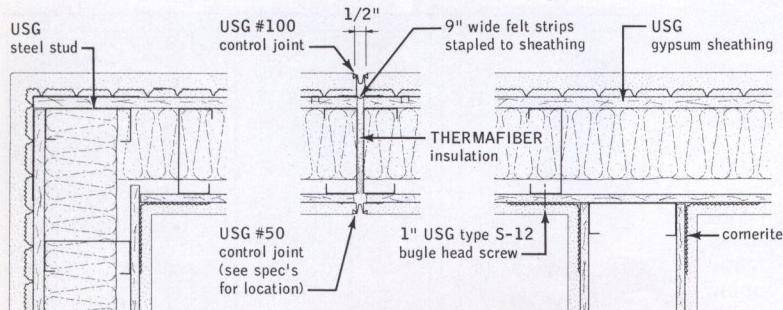
intermediate floor



foundation



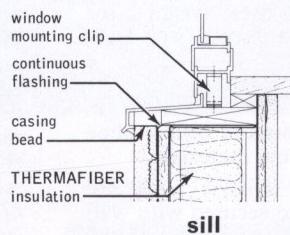
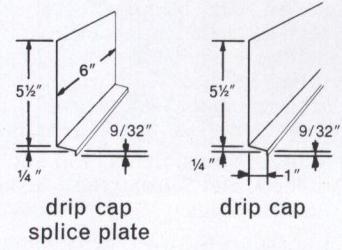
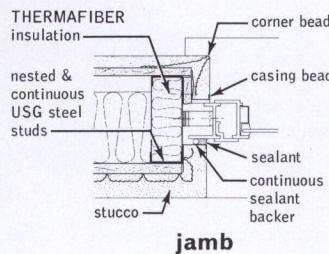
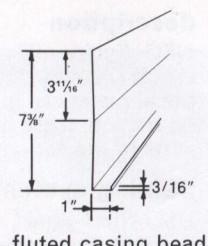
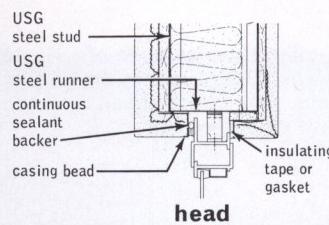
wall plan sections



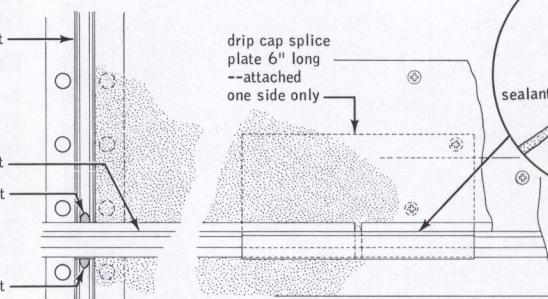
corner

control joint

intersecting partition

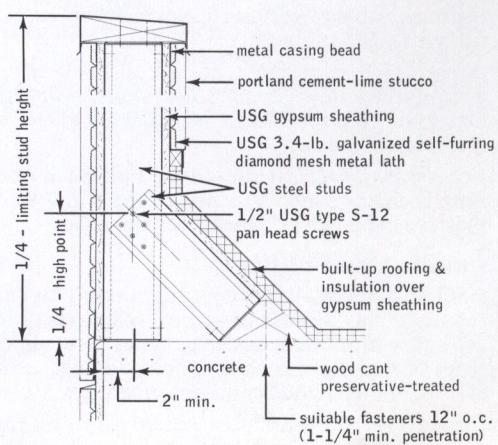


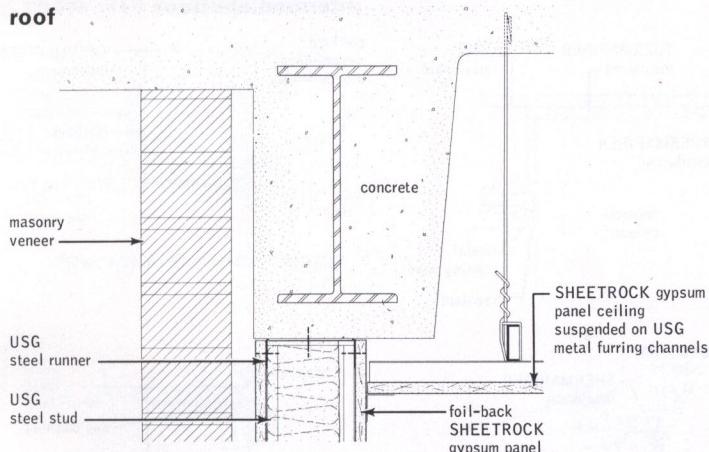
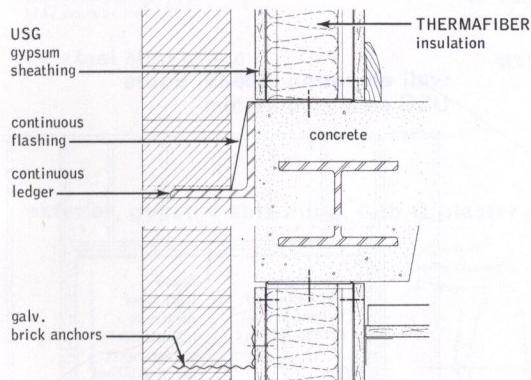
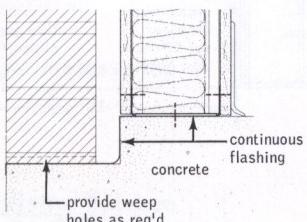
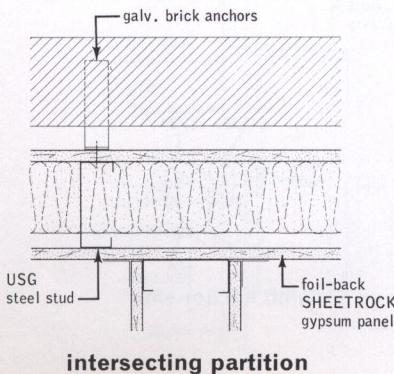
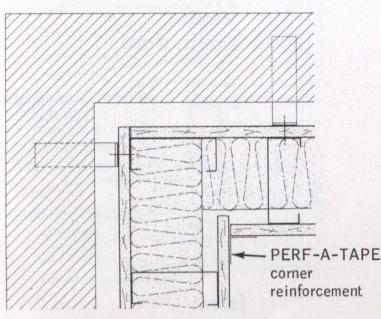
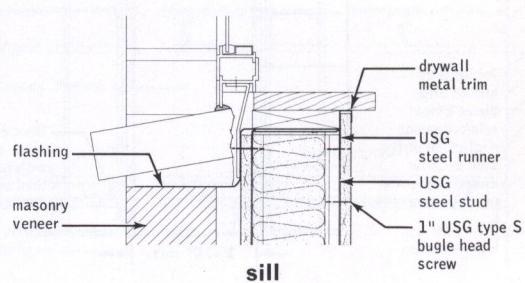
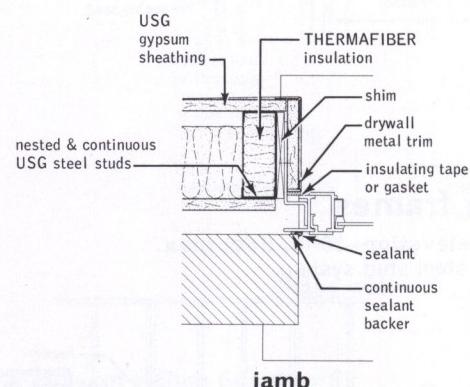
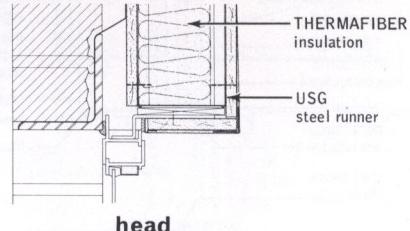
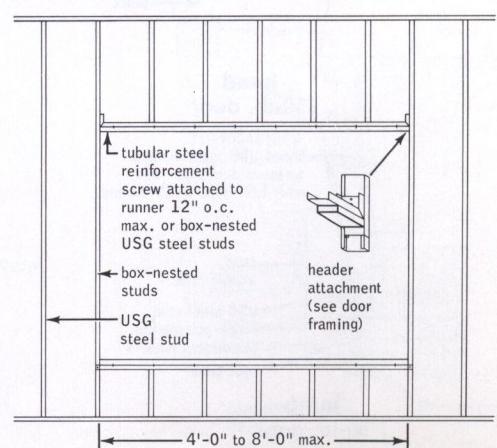
horizontal flashing control joint



elevation-control joint intersection

parapet



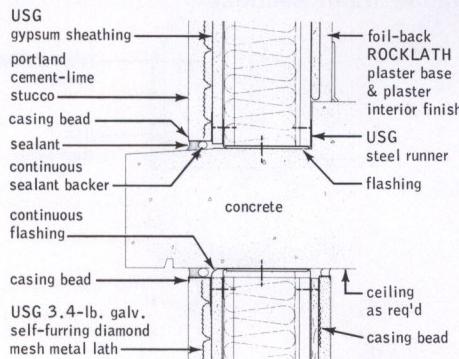
details**exterior masonry veneer/steel frame****roof****intermediate floor****foundation****wall plan sections****window frame sections****wall elevation—window opening**
USG steel stud system

details

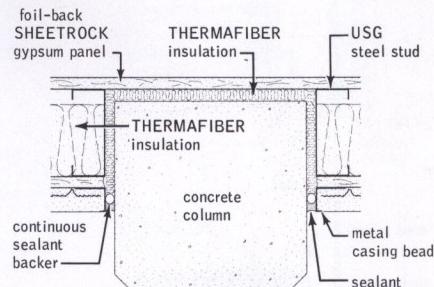
scale: $1\frac{1}{2}''=1'-0''$

exterior stucco/concrete frame

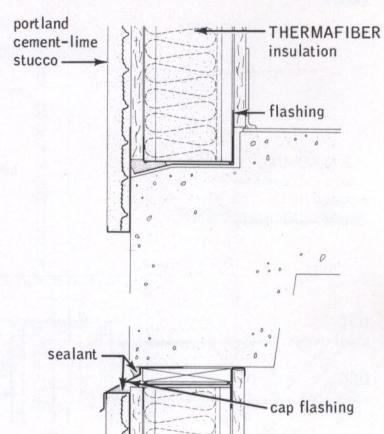
intermediate floor



column

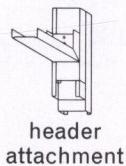
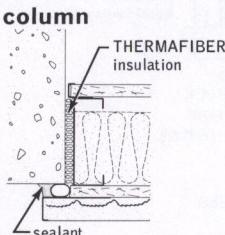
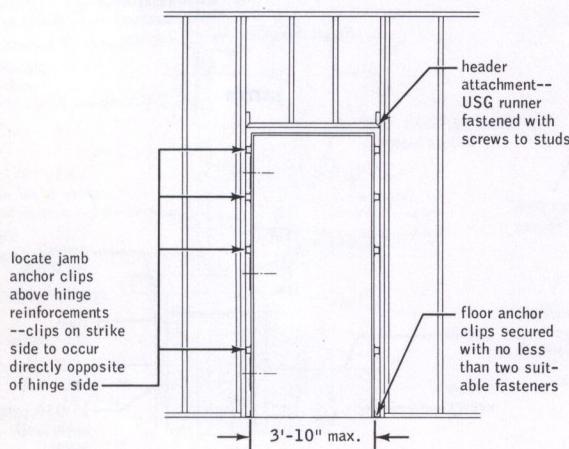


intermediate floor

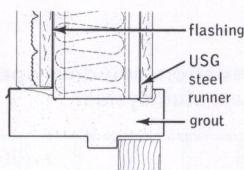
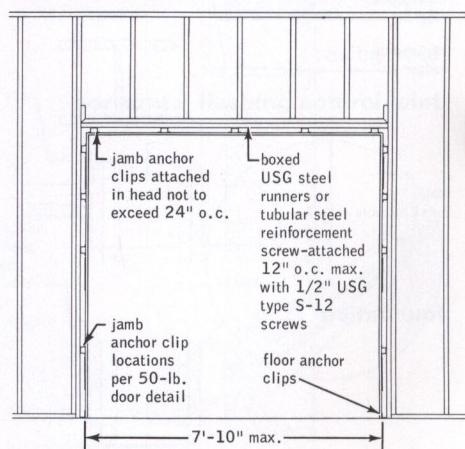


door frames

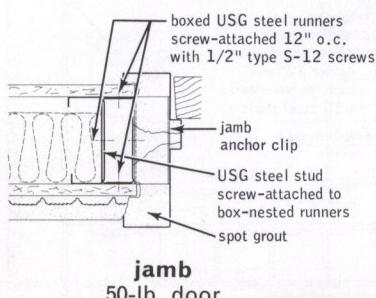
wall elevation—50-lb. door max. USG steel stud system



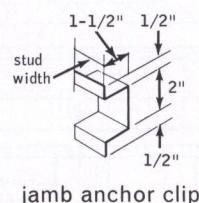
wall elevation—200-lb. doors USG steel stud system



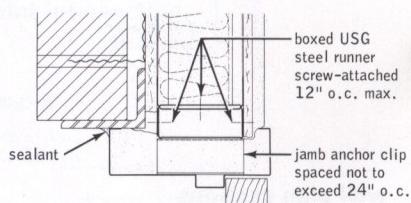
head
50-lb. door



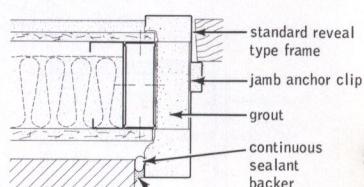
jamb
50-lb. door



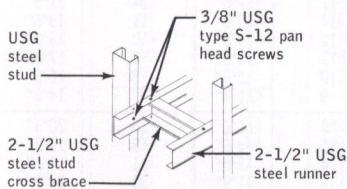
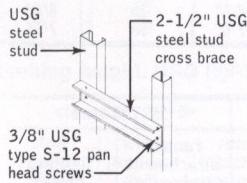
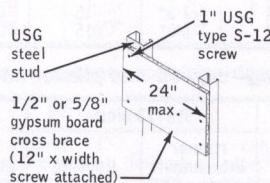
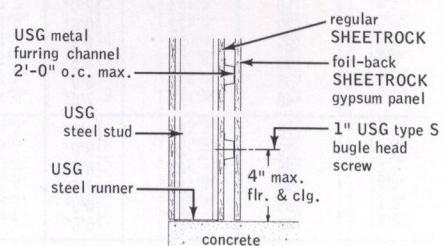
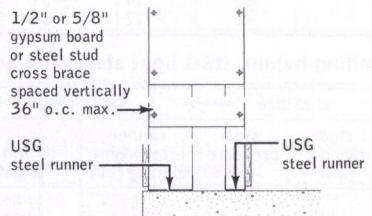
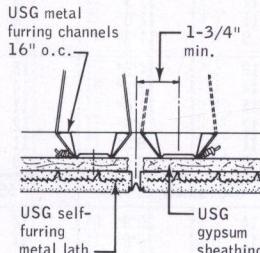
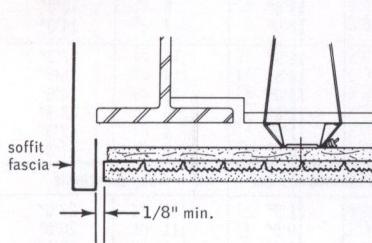
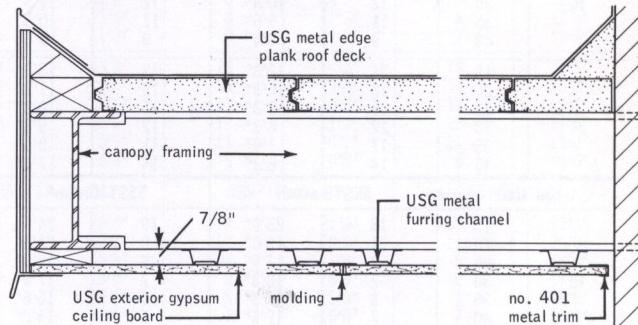
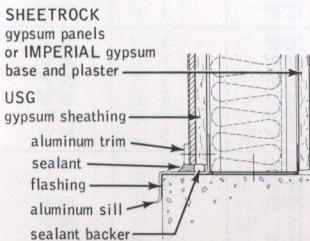
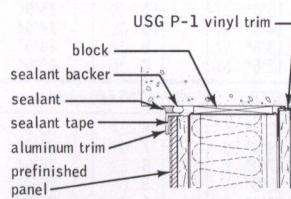
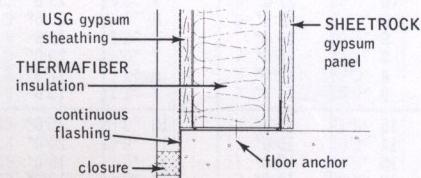
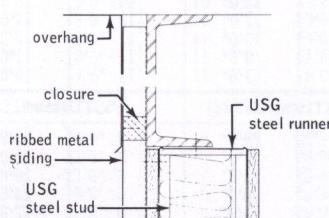
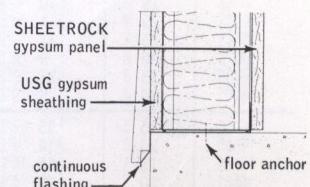
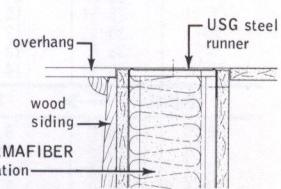
jamb anchor clip



head
50 to 200-lb. door



jamb
50 to 200-lb. door

details**chase wall bracing****steel stud & runner brace****steel stud brace****gypsum brace****furred & chase walls****furred wall****chase wall****exterior, gypsum sheathing, lath & plaster soffit****perimeter relief****control joint****exterior gypsum ceiling board soffit****optional exterior finishes****prefinished panel****steel panel****wood siding**

limiting height/stucco exterior

limiting height, USG light steel stud and runner fastener spacing—drywall, plaster and chase wall interior

stud size →		20ST10 stud		212ST10 stud		30ST10 stud		358ST10 stud		40ST10 stud		60ST10 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height
12	15	24	12'0"	22	13'6"	19	15'9"	18	16'6"	17	17'6"	14	21'6"
	20	22	10'6"	18	12'3"	16	13'9"	15	15'0"	14	16'0"	11	19'6"
	25	20	9'3"	16	11'0"	15	12'3"	13	14'0"	12	14'9"	10	18'0"
	30	18	8'6"	15	10'0"	13	11'3"	12	12'9"	11	13'9"	9	17'0"
	35	16	8'0"	14	9'3"	12	10'3"	11	11'9"	10	12'9"	8	15'9"
	40	15	7'6"	13	8'9"	11	9'9"	10	11'0"	9	11'9"	7	14'9"
16	15	24	10'6"	24	12'3"	22	13'9"	19	15'9"	18	16'6"	15	20'3"
	20	24	9'0"	21	10'9"	19	11'9"	17	13'6"	15	14'6"	12	18'0"
	25	23	8'0"	19	9'6"	17	10'6"	15	12'3"	14	13'0"	11	16'0"
	30	20	7'6"	17	8'9"	15	9'9"	14	11'0"	13	11'9"	10	14'9"
	35	19	6'9"	16	8'0"	14	9'0"	12	10'3"	12	11'0"	10	12'9"
	40	17	6'6"	15	7'6"	14	8'3"	12	9'6"	11	10'3"	10	11'3"
24	15	24	8'6"	24	10'0"	24	11'3"	24	12'9"	22	13'9"	18	17'0"
	20	24	7'6"	24	8'9"	23	9'9"	21	11'0"	19	11'9"	15	14'9"
	25	24	6'6"	23	7'9"	21	8'6"	18	10'0"	17	10'6"	15	12'0"
	30	24	6'0"	22	7'0"	19	7'9"	17	9'0"	15	9'9"	15	10'0"
	35	24	5'6"	20	6'6"	18	7'3"	15	8'6"	15	8'6"	15	8'6"
	40	22	5'3"	18	6'3"	17	6'9"	15	7'6"	15	7'6"	15	7'6"

limiting height, USG light steel stud and runner fastener spacing—drywall and plaster interior

stud size →		35ST8 stud		35ST10 stud		35ST13 stud		35ST16 stud		35ST20 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height
12	15	15	17'0"	15	18'6"	15	19'6"	13	20'0"	13	20'6"
	20	14	14'9"	14	16'0"	11	17'9"	11	18'3"	11	18'6"
	25	11	13'0"	11	14'6"	9	16'2"	9	16'9"	9	17'8"
	30	12	12'0"	9	13'3"	9	14'9"	9	16'0"	7	16'3"
	35	11	11'0"	8	12'3"	8	13'9"	8	15'0"	8	15'6"
	40	9	10'3"	9	11'3"	7	12'9"	7	14'6"	7	14'9"
16	15	19	14'9"	15	16'0"	15	18'3"	15	19'6"	15	19'9"
	20	14	12'9"	14	14'0"	14	15'9"	11	17'9"	11	18'0"
	25	15	11'3"	11	12'6"	11	14'0"	11	16'0"	9	16'9"
	30	12	10'3"	12	11'3"	12	12'9"	9	14'6"	9	15'9"
	35	11	9'6"	11	10'6"	11	12'0"	8	13'6"	8	13'0"
	40	9	9'0"	9	9'9"	9	11'3"	7	12'6"	7	14'0"
24	15	24	12'0"	19	13'3"	19	14'9"	15	16'9"	15	17'3"
	20	18	10'3"	18	11'3"	14	12'9"	14	14'6"	14	15'9"
	25	15	9'3"	15	10'3"	15	11'6"	11	13'0"	11	14'6"
	30	12	8'3"	12	9'3"	12	10'6"	12	12'0"	9	13'3"
	35	17	7'0"	11	8'6"	11	9'9"	11	11'0"	8	12'3"
	40	14	6'3"	14	7'6"	9	9'0"	9	10'3"	9	11'3"

stud size →		55ST8 stud		55ST10 stud		55ST13 stud		55ST16 stud		55ST20 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height
12	15	13	23'0"	10	24'6"	14	20'9"	14	21'9"	13	23'0"
	20	11	19'0"	9	21'9"	12	19'0"	11	19'9"	11	20'9"
	25	9	17'9"	9	19'6"	10	17'6"	10	18'3"	9	19'3"
	30	7	16'3"	7	17'9"	9	16'6"	8	17'3"	8	18'3"
	35	8	14'3"	6	16'6"	8	15'9"	8	16'3"	7	17'3"
	40	7	12'6"	7	15'0"	7	15'0"	7	15'9"	7	16'6"
16	15	15	20'0"	13	21'9"	15	19'6"	15	20'3"	14	21'3"
	20	11	17'3"	11	19'0"	13	17'9"	12	18'6"	11	19'6"
	25	11	15'0"	9	17'0"	11	16'6"	10	17'3"	10	18'0"
	30	9	12'6"	9	15'0"	9	15'6"	9	16'3"	9	17'0"
	35	11	10'9"	8	12'9"	8	14'9"	8	15'3"	8	16'0"
	40	9	9'3"	9	11'3"	8	14'0"	7	14'9"	7	15'6"
24	15	15	16'3"	15	17'9"	18	17'0"	17	17'9"	16	18'9"
	20	14	12'6"	14	15'0"	14	15'6"	14	16'3"	13	17'0"
	25	15	10'0"	15	12'0"	12	14'6"	12	15'0"	11	15'9"
	30	12	8'3"	12	10'0"	11	13'3"	11	14'0"	10	14'9"
	35	17	7'0"	11	8'6"	11	11'6"	9	13'6"	9	14'0"
	40	14	6'3"	14	7'6"	11	10'0"	9	12'6"	8	13'6"

stud size →		75ST8 stud		75ST10 stud		75ST13 stud		75ST16 stud		75ST20 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height
12	15	9	28'6"	9	29'9"	9	30'9"	9	32'0"	8	33'3"
	20	8	24'9"	8	27'0"	8	28'0"	8	29'3"	7	30'3"
	25	9	20'0"	7	24'0"	6	26'0"	6	27'0"	6	28'0"
	30	7	16'6"	7	20'0"	5	24'6"	6	25'6"	5	26'3"
	35	8	14'3"	8	17'3"	5	22'9"	5	24'3"	4	25'0"
	40	7	12'6"	7	15'0"	5	20'0"	4	23'0"	4	24'0"
16	15	10	24'9"	10	27'0"	9	29'6"	9	30'9"	9	31'9"
	20	11	18'9"	9	22'6"	8	26'6"	8	28'0"	7	28'9"
	25	11	15'0"	9	18'0"	7	23'9"	7	26'0"	6	26'9"
	30	9	12'6"	9	15'0"	7	20'0"	6	24'3"	5	25'0"
	35	11	10'9"	8	12'9"	6	17'3"	5	21'3"	5	23'9"
	40	9	9'3"	9	11'3"	7	15'0"	5	18'9"	5	22'9"
24	15	15	16'3"	15	20'0"	10	25'0"	10	26'9"	10	27'9"
	20	14	12'6"	14	15'0"	11	20'0"	9	24'3"	8	25'0"
	25	15	10'0"	15	12'0"	11	16'0"	9	20'0"	7	23'3"
	30	12	8'3"	12	10'0"	12	13'3"	9	16'6"	6	20'9"
	35	17	7'0"	11	8'6"	11	11'6"	8	14'3"	6	17'9"
	40	14	6'3"	14	7'6"	9	10'0"	7	12'6"	7	15'6"

limiting height/masonry exterior

limiting height, USG light steel stud and runner fastener spacing—drywall, plaster and chase wall interior

stud size →		20ST10 stud		212ST10 stud		30ST10 stud		358ST10 stud		40ST10 stud		60ST10 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height
12	15	24	10'3"	24	10'0"	24	11'6"	24	11'3"	23	13'0"	21	14'3"
	20	22	10'3"	23	10'0"	20	11'6"	20	11'3"	17	13'0"	16	14'3"
	25	20	9'3"	18	10'0"	16	11'6"	16	11'3"	14	13'0"	13	14'3"
	30	18	8'6"	15	10'9"	13	11'3"	13	11'3"	11	13'0"	10	14'0"
	35	16	8'0"	14	9'3"	12	10'3"	11	11'3"	10	12'6"	9	14'0"
	40	15	7'6"	13	8'9"	11	9'9"	10	11'0"	9	11'9"	8	13'3"
16	15	24	10'0"	24	9'9"	24	11'0"	24	10'9"	24	12'3"	23	13'3"
	20	24	9'0"	23	9'9"	21	11'0"	21	10'9"	18	12'3"	17	13'3"
	25	23	8'0"	19	9'6"	17	10'6"	17	10'9"	15	12'3"	13	13'3"
	30	20	7'6"	17	8'9"	15	9'9"	14	10'9"	13	11'9"	11	13'3"
	35	19	6'9"	16	8'0"	14	9'0"	12	10'3"	12	10'9"	9	12'3"
	40	17	6'6"	15	7'6"	14	8'3"	12	9'6"	11	10'0"	9	11'3"
24	15	24	8'6"	24	8'6"	24	9'9"	24	9'6"	24	10'9"	24	11'6"
	20	24	7'6"	24	8'6"	23	9'9"	24	9'6"	21	10'9"	20	11'6"
	25	24	6'6"	23	7'9"	21	8'6"	19	9'6"	17	10'6"	16	11'6"
	30	24	6'0"	22	7'0"	19	7'9"	17	9'0"	16	9'6"	13	10'0"
	35	24	5'6"	20	6'6"	18	7'3"	15	8'6"	15	8'6"	12	8'6"
	40	22	5'3"	18	6'3"	17	6'9"	15	7'6"	15	7'6"	11	7'6"

limiting height, USG light steel stud and runner fastener spacing—drywall and plaster interior

stud size →		35ST8 stud		35ST10 stud		35ST13 stud		35ST16 stud		35ST20 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height
12	15	19	15'3"	19	15'9"	15	16'6"	15	17'0"	15	17'9"
	20	14	14'0"	14	14'3"	14	15'0"	14	15'6"	14	16'0"
	25	11	13'0"	11	13'3"	11	13'9"	11	14'6"	11	15'0"
	30	12	12'0"	9	12'6"	9	13'0"	9	13'6"	9	14'0"
	35	11	11'0"	11	12'0"	8	12'3"	8	13'0"	8	13'3"
	40	9	10'3"	9	11'3"	9	11'9"	7	12'3"	7	12'9"
16	15	19	14'9"	19	15'3"	19	15'9"	15	16'3"	15	16'9"
	20	14	12'9"	14	13'9"	14	14'3"	14	14'9"	14	15'3"
	25	15	11'3"	11	12'6"	11	13'3"	11	13'9"	11	14'3"
	30	12	10'3"	12	11'3"	12	12'6"	9	13'0"	9	13'3"
	35	11	9'6"	11	10'6"	11	11'9"	8	12'3"	8	12'9"
	40	9	9'0"	9	9'9"	9	11'3"	9	11'9"	7	12'3"
24	15	24	12'0"	19	13'3"	19	13'9"	19	14'3"	19	14'9"
	20	18	10'3"	18	11'3"	14	12'6"	14	13'0"	14	13'3"
	25	15	9'3"	15	10'3"	15	11'6"	15	12'0"	11	12'6"
	30	12	8'3"	12	9'3"	12	10'6"	12	11'3"	12	11'9"
	35	17	7'0"	11	8'6"	11	9'9"	11	10'9"	11	11'0"
	40	14	6'3"	14	7'6"	9	8'6"	9	10'3"	9	10'6"

stud size →		55ST8 stud		55ST10 stud		55ST13 stud		55ST16 stud		55ST20 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height
12	15	15	19'6"	13	20'3"	15	20'0"	14	21'0"	13	22'3"
	20	11	17'9"	11	18'6"	12	18'3"	12	19'0"	11	20'3"
	25	9	16'6"	9	17'0"	11	16'9"	10	17'9"	9	18'9"
	30	9	15'6"	9	16'0"	9	15'9"	9	16'9"	8	17'9"
	35	8	14'3"	8	15'3"	8	15'0"	8	15'9"	7	16'9"
	40	7	12'6"	7	14'6"	7	14'6"	7	15'0"	7	16'0"
16	15	15	18'6"	15	19'3"	16	18'6"	15	16'9"	15	20'6"
	20	11	17'0"	11	17'6"	13	17'0"	13	17'9"	12	18'9"
	25	11	15'0"	9	16'3"	11	15'9"	11	16'6"	10	17'3"
	30	9	12'6"	9	15'0"	10	14'9"	9	15'6"	9	16'3"
	35	11	10'9"	8	12'9"	9	14'0"	8	14'9"	8	15'6"
	40	9	9'3"	9	11'3"	8	13'6"	8	14'0"	7	14'9"
24	15	15	16'3"	15	16'9"	19	16'3"	18	17'0"	17	18'0"
	20	14	12'6"	14	15'0"	15	14'9"	14	15'6"	14	16'3"
	25	15	10'0"	15	12'0"	13	13'9"	13	14'3"	12	15'3"
	30	12	8'3"	12	10'0"	11	13'0"	11	13'6"	10	14'3"
	35	17	7'0"	11	8'6"	11	11'6"	10	12'9"	9	13'6"
	40	14	6'3"	14	7'6"	11	10'0"	9	12'3"	8	13'0"

stud size →		75ST8 stud		75ST10 stud		75ST13 stud		75ST16 stud		75ST20 stud	
stud spacing (in.)	wind pressure psf	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height	runner attachment spacing (in.)	limiting height
12	15	13	23'9"	10	24'9"	10	26'3"	10	28'0"	9	29'6"
	20	9	21'9"	9	22'6"	9	23'9"	8	25'6"	8	26'9"
	25	9	20'0"	7	21'0"	7	22'0"	7	23'6"	6	24'9"
	30	7	16'6"	7	19'9"	6	20'9"	6	22'3"	6	23'6"
	35	8	14'3"	6	17'3"	6	19'9"	5	21'0"	5	22'3"
	40	7	12'6"	7	15'0"	5	19'0"	4	20'3"	4	21'3"
16	15	13	22'6"	13	23'3"	10	24'6"	10	26'3"	10	27'6"
	20	11	18'9"	9	21'3"	9	22'3"	9	23'9"	8	25'0"
	25	11	15'0"	9	18'0"	7	20'9"	7	22'0"	7	23'3"
	30	9	12'6"	9	15'0"	7	19'6"	6	20'9"	6	21'9"
	35	11	10'9"	8	12'9"	6	17'3"	6	19'9"	5	20'9"
	40	9	9'3"	9	11'3"	7	15'0"	5	18'9"	5	19'9"
24	15	15	16'6"	15	20'0"	13	21'6"	13	22'9"	13	24'0"
	20	14	12'6"	14	15'0"	11	19'6"	9	20'9"	9	21'9"
	25	15	10'0"	15	12'0"	11	16'0"	9	19'3"	7	20'3"
	30	12	8'3"	12	10'0"	9	13'3"	7	16'6"	7	19'0"
	35	17	7'0"	11	8'6"	11	11'6"	8	14'3"	6	17'9"
	40	14	6'3"	14	7'6"	9	10'0"	7	12'6"	7	15'6"

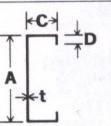
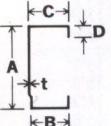
technical data

thermal properties

wall type	stud sizes	insulation thickness (in.)	thermal transmittance (1)	
			R	U
Stucco Exterior—	2", 2½", 3½", 3¾", 4", 5½", 6", 7½"	0	4.41	.23
Plaster or	3½", 3¾", 4", 5½", 6", 7½"	3	15.55	.06
Drywall Interior	4, 5½", 6", 7½"	3½	17.81	.06
Masonry Exterior—	2", 2½", 3½", 3¾", 4", 5½", 6", 7½"	0	5.62	.18
Plaster or	3½", 3¾", 4", 5½", 6", 7½"	3	16.76	.06
Drywall Interior	4", 5½", 6", 7½"	3½	19.02	.05

(1) Values based on actual air space thickness.

physical properties

stud system		dimension				metal thickness t(1)	net area sq. in.(2)	wt. lb. per lin. ft.
		A	B	C	D			
	20ST10	2"	1.250	1.406	0.438	0.0359	0.187	0.613
	212ST10	2½"	1.250	1.406	0.438	0.0359	0.205	0.760
	30ST10	3"	1.250	1.406	0.438	0.0359	0.223	0.762
	358ST10	3¾"	1.250	1.406	0.438	0.0359	0.245	0.920
	40ST10	4"	1.250	1.406	0.438	0.0359	0.259	0.960
	60ST10	6"	1.250	1.406	0.438	0.0359	0.331	1.230
	35ST8	3.448	1.606	1.724	0.500	0.0322	0.217	.85
	35ST10	3.448	1.606	1.724	0.500	0.0382	0.262	1.00
	35ST13	3.448	1.606	1.724	0.500	0.0486	0.338	1.26
	35ST16	3.421	1.552	1.724	0.625	0.0635	0.453	1.71
	35ST20	3.421	1.552	1.724	0.625	0.0785	0.558	2.11
	55ST8	5.448	1.606	1.724	0.500	0.0322	0.278	1.09
	55ST10	5.448	1.606	1.724	0.500	0.0382	0.335	1.29
	55ST13	5.448	1.606	1.724	0.500	0.0486	0.428	1.68
	55ST16	5.421	1.552	1.724	0.625	0.0635	0.587	2.21
	55ST20	5.421	1.552	1.724	0.625	0.0785	0.725	2.71
	75ST8	7.448	1.606	1.724	0.500	0.0322	0.334	1.32
	75ST10	7.448	1.606	1.724	0.500	0.0382	0.404	1.56
	75ST13	7.448	1.606	1.724	0.500	0.0486	0.524	1.97
	75ST16	7.421	1.552	1.724	0.625	0.0635	0.707	2.63
	75ST20	7.421	1.552	1.724	0.625	0.0785	0.875	3.23

(1) Including galvanized coating. (2) Excluding galvanized coating.

specifications

notes to architect

1. These specifications are for exterior non-load bearing curtain wall systems using USG Light Steel Studs and securely attached interior and exterior facings. Expand or alter as necessary for project specifications.

2. Maximum allowable wall heights, stud spacings, and runner attachment spacings are shown in Technical Data, pages 8 and 9. Select values and insert in the specifications. Brick veneer must be structurally supported at every floor.

3. **Shadowing and Spotting**—During periods of low outside temperature, condensation may form on outside walls, collecting airborne dirt to produce shadowing and spotting over fasteners and furring. This is a natural phenomenon which occurs through no fault in the products.

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternates should be considered:

a. The interior facing of Foil-Back SHEETROCK Panels should be furred from the studs using a base layer of panels screw-attached to the studs and horizontally applied USG Metal Furring Channels spaced 24" o.c. (see details, page 7).

b. For maximum resistance to shadowing and spotting, a separate chase wall construction is recommended using studs that are independent of the exterior studs and membrane (see details, page 7).

4. **Expansion and Contraction**—Curtain wall surfaces should be isolated with control joints or other means where: (a) curtain wall abuts a structural element (except floor) or dissimilar wall or ceiling; (b) construction changes within the plane of the wall; (c) stucco surfaces exceed 10' in either direction; (d) the area within stucco sections exceeds 100 sq. ft.; (e) the basic construction contains a control joint; (f) interior partition run exceeds 30'. Ceiling-height door and window frames may be used as control joints, as may less-than-ceiling height frames if control joints extend to the ceiling and floor from both corners.

Sheathing should be broken behind control joints. Where vertical and horizontal joints intersect, the horizontal joint should be continuous and the vertical joint should abut it. Splices, terminals and intersections should be caulked with a sealant.

5. **Air and Water Infiltration**—Flashing and sealants as shown in the details should be provided to resist air and water infiltration. Accessories for stucco finishes should be made of zinc alloy with weep holes 12" o.c. In high-wind areas where moisture may penetrate porous stucco and masonry exteriors, an additional weather-resistant barrier such as 15-lb. felt building paper applied over the gypsum sheathing may be required.

6. **Corrosive Materials**—USG Metal Lath, Control Joints and other USG Metal Accessories should not be used with magnesium oxychloride cement stuccos or stuccos containing calcium chloride additives. Zinc-alloy accessories are available from U.S.G. for use in specific applications.

7. **Prefinished Panels**—Ceramic, aggregated or porcelain-enamedled panels, metal siding and other dry exterior facings weighing up to 8 psf may be applied over gypsum sheathing and screw-attached to studs. Use stainless steel or cadmium-plated screws, spaced according to siding manufacturer's recommendations. Screws should not transfer more than 15 lbs. panel weight per screw to studs. Screw lengths are based on panel thickness plus $\frac{1}{8}$ ".

8. See U.S.G. product folders in this series: Gypsum Panels & Accessories Folder SA-927 for information on system components; Paint Products Folder SA-933 for paint specifications; Gypsum Plasters, Bases & Accessories Folder SA-917 for plaster system components and specifications; Insulation Products Folder SA-705 for data on insulation and mineral fire-proofing.

(1) Maximum allowable flexural stress: 20,000 psi.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during the period of gypsum panel and joint finishing or lath and plaster application, temperatures within the building shall be maintained uniformly within the range of 55°F. Adequate ventilation shall be provided to eliminate excessive moisture within the building during this period.

1.5 certificates of compliance

Prior to shipping any exterior curtain wall material to the site, the Contractor shall submit to the Architect copies of manufacturer's certificates showing compliance with the air and water infiltration standards set by NAAMM at the specified wind velocity. All certificates shall be issued by an independent testing laboratory.

Part 2: products

2.1 materials manufactured by United States Gypsum

a. Studs and Runners

1. USG Light Steel Studs and Runners—Nos. 20ST10 (2"), 212ST10 (2½"), 30ST10 (3"), 358ST10 (3½"), 40ST10 (4"), 60ST10 (6"), 35ST8 (3½"), 35ST10 (3½"), 35ST13 (3½"), 35ST16 (3½"), 35ST20 (3½"), 55ST8 (5½"), 55ST10 (5½"), 55ST13 (5½"), 55ST16 (5½"), 55ST20 (5½"), 75ST8 (7½"), 75ST10 (7½"), 75ST13 (7½"), 75ST16 (7½"), 75ST20 (7½"); and Runner Nos. 35CR8 (3½"), 35CR10 (3½"), 35CR13 (3½"), 55CR8 (5½"), 55CR10 (5½"), 55CR13 (5½"), 55CR16 (5½"), 55CR20 (5½"), 75CR8 (7½"), 75CR10 (7½"), 75CR13 (7½"), 75CR16 (7½"), 75CR20 (7½").

2. Standard USG Steel Studs and Runners—Nos. 158ST5 (1½"), 212ST5 (2½"), 358ST5 (3½"), for interior chase wall.

3. USG Metal Furring Channel, for furred interior wall.

b. Sheathing—USG Gypsum Sheathing—½" thick, (2'x8') (4'x8').

c. Insulation

1. THERMAFIBER Metal Stud Insulating Blankets—(3") (3½") thick, (16") (24") wide x (48") (96") long or Contractor CW-40 THERMAFIBER Insulation (2") (3") (4") thick, (16") (24") wide x 48" long.

2. THERMAFIBER Sound Attenuation Blankets—(1½") (2") thick, x (16"x48") (24"x48"). (Use where noncombustibility is required. Specify foil-back interior gypsum panels or lath as vapor barrier.)

d. Gypsum Panels

1. Face Boards—Foil-Back SHEETROCK (FIRECODE) Gypsum Panels (½") (¾") thick, 48" wide, lengths as required.

2. Backing Boards—Regular SHEETROCK Gypsum Panels (½") (¾") thick, 48" wide, lengths as required (for furred wall construction).

e. Gypsum Base

1. Foil-Back ROCKLATH Plaster Base (for standard plasters) ¾" thick, (16" x 48") (16" x lengths as required).

2. Foil-Back IMPERIAL Gypsum Base (for veneer plasters) ½" thick, 48" wide, lengths as required.

f. Plasters for Interior Surfaces

1. Standard Plasters and Finishes—

- a. RED TOP Gypsum Plaster (100:2).
- b. RED TOP Wood Fiber Plaster (100:1).
- c. STRUCTO-BASE Gypsum Plaster (100:2).
- d. STRUCTO-GAUGE Gauging Plaster and IVORY Lime (1:1 or 1:2).
- e. RED TOP Keenes Cement and IVORY Lime (4:1 or 2:1).

2. Veneer Plasters and Finishes—

- a. IMPERIAL Finish Plaster (*single-coat system*).
- b. IMPERIAL Basecoat Plaster (*two-coat system; specify finish plaster from d or e above or c below*).
- c. DIAMOND Interior Finish (*single-coat system or two-coat system over IMPERIAL Basecoat Plaster*).

g. Metal Lath—3.4-lb. USG Galvanized (Self-Furring) (Poly-Backed) Junior Diamond Mesh Lath 27" x 96".

h. USG Brand Screws and Clips

- 1. (1") (1¼") (1⅓") Type S-12, Bugle Head.
- 2. ¾" Type S-12, Pan Head.
- 3. 1" Type S, Bugle Head, for standard USG steel components.

i. Lathing Accessories—(*specify from Gypsum Plasters, Bases & Accessories folder SA-917; specify 1" grounds; 1" casing beads not available from U.S.G.*)

j. Exterior Stucco—ORIENTAL Exterior Stucco.

k. Drywall Accessories—(*specify from U.S.G. Folder SA-927*).

l. Joint Treatment—(*specify from U.S.G. Folder SA-927*).

2.2 materials by other manufacturers

a. Portland-Cement Stucco—Mixed in accordance with ANSI A42.2, Type L to the following proportions: scratch coat—1 bag cement: ¾ bag lime: 5 to 6 cu. ft. sand; brown coat—1 bag cement: 1 bag BONDCRETE Lime: 6 to 7 cu. ft. sand.

b. Marblecrete Materials—(specified by architect) meeting requirements of local contractors' association and jurisdictional authorities (stucco applied to a full 1" thickness).

c. Masonry Materials

1. Brick, face or common; or other masonry units, and mortar materials (specified by architect).

2. Brick anchors—corrugated 22-ga. hot-dipped galvanized sheet steel with sufficient cross-section to withstand 220 lbs. without exceeding yield point or breaking mortar bond, or as recommended by the Brick Institute of America.

d. Runner Fasteners—power-driven type with ability to withstand 193 lbs. single shear and 200 lbs. bearing force when driven into structural head or base and without exceeding allowable stress in runner, fastener or structural support.

e. Polyethylene Film—8 mil thick, clear.

Part 3: execution

3.1 erection

3.1.1 studs and runners

a. Align runner track accurately according to exterior wall layout and secure to base and head with power-driven fastener spaced () (choose spacing from Technical Data tables).

b. Position steel studs vertically in runners and space no greater than (12") (16") (24") (choose spacing from Technical Data tables). Securely anchor each stud to runners with four ¾" type S-12 pan head screws, two at top and two at bottom, with one screw in each flange.

c. For chase wall, align additional interior runners accurately at floor and ceiling and securely anchor with suitable fasteners spaced not more than 24" o.c. Position studs vertically in runners, spaced no greater than (12") (16") (24") o.c. and located no more than 2" from all door and window jambs abutting partitions, partition corners and other construction.

SA**805****exterior walls****USG curtain wall systems**

Anchor all studs located adjacent to door and window frames, partition intersections and corners to runner flanges by positive screw engagement through stud and runner flanges.

3.1.2 exterior sheathing

Apply USG Gypsum Sheathing horizontally and screw-attach to exterior of each stud with 1" type S-12 screws spaced $\frac{3}{8}$ " from ends and edges and approx. 8" o.c. When stucco exterior will be applied, sheathing may be tacked in place, since later application of self-furring metal lath will complete sheathing anchorage. All sheathing tacked in this manner must be covered with metal lath immediately.

3.1.3 exterior metal lath and accessories

a. Apply metal lath with long dimension across supports, with ends lapped 1" and staggered in adjacent courses, sides lapped $\frac{1}{2}$ ". Screw-attach self-furring metal lath through sheathing to steel studs and runners with 1 $\frac{1}{4}$ " type S-12 screws spaced 8" o.c.

b. Install USG Control Joint No. 100 where indicated on the drawings. Back control joints with 9" wide, No. 15 asphalt felt strips stapled to the sheathing. Install joints with flanges under self-furring lath and attach with Bostitch $\frac{9}{16}$ " "G" staples or equal, spaced 6" apart on each flange. Break supporting members and sheathing behind control joints. Apply sealant at all splices, intersections and terminals.

c. Apply other lathing accessories per U.S.G. Folder SA-917.

3.1.4 masonry materials

a. Erect per architect's specifications and details.

b. Anchor brick with masonry anchors spaced 24" o.c. vertically and screw-attached to each metal stud. Anchor other masonry units to each stud in a similar manner, 16" o.c. max.

3.1.5 other dry exterior facings

Follow manufacturer's recommendations for application.

3.1.6 insulation

Insert THERMAFIBER Metal Stud Blankets between studs and staple to gypsum sheathing using $\frac{9}{16}$ " staples with divergent points placed at each corner and in the center of each blanket,

Preassembly of exterior curtain wall sections at jobsite saves time and money. Sections slip firmly and easily into place.



TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, THERMAFIBER, FIRECODE, SHEETROCK, IMPERIAL, ROCKLATH, RED TOP, PERF-A-TAPE, STRUCTO-BASE, STRUCTO-GAUGE, IVORY, ORIENTAL, STRUCTO-LITE, DIAMOND, BONDCRETE.

or friction-fit Contractor CW-40 THERMAFIBER Insulation between steel studs.

3.1.7 drywall interior

a. Position Foil-Back SHEETROCK (FIRECODE) Gypsum Panels vertically or horizontally and attach to studs with 1" type S-12 screws spaced 8" o.c.

b. For furred interior construction, apply regular SHEETROCK Gypsum Panels vertically or horizontally and attach to studs with 1" type S-12 screws 8" o.c. Over the first panel layer, apply USG Metal Furring Channels horizontally 24" o.c. and screw-attach through panels into metal studs. Attach each channel attachment flange to each stud with 1" type S-12 screws. Screw-attach a second layer of Foil-Back SHEETROCK Gypsum Panels to furring channels with 1" type S screws spaced 12" o.c.

c. For chase wall interior construction, space gypsum panel or steel stud cross braces not to exceed 48" o.c. vertically. Screw-attach gypsum braces to stud webs with three type S-12 screws or screw-attach steel stud and runner braces with $\frac{3}{8}$ " type S-12 screws. Apply Foil-Back SHEETROCK Gypsum Panels to interior stud row with 1" type S screws spaced 12" o.c.

d. Install drywall accessories, finish joints, accessories and screw heads per U.S.G. Folder SA-927.

3.1.8 standard lath and plaster interior

a. Apply Foil-Back ROCKLATH Plaster Base face out with long dimension across studs. Butt ends together over studs with joints staggered in successive courses. Attach lath to each steel stud with 1" type S-12 screws spaced 8" o.c. and at least $\frac{3}{8}$ " from ends and edges.

b. Install lathing accessories and apply gypsum sand basecoat and finish plaster per U.S.G. Folder SA-917.

3.1.9 veneer plaster interior

a. Apply Foil-Back IMPERIAL Gypsum Base vertically or horizontally and attach to steel studs with 1" type S-12 screws spaced 8" o.c.

b. Install lathing accessories and apply IMPERIAL Plaster per U.S.G. Folder SA-917.

Before masonry application, bare curtain wall forms weathertight membrane when windows are installed. Interior work can proceed.



Note: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.



KINKEAD

float-away®
Closet Systems



8.11/Ki

KINKEAD INDUSTRIES
1975-1

1975-1



8 P

SPECIAL DOORS
bi-fold doors

float-away Closet Systems all-steel bi-fold doors and shelves

Only with float-away... all these beauty and reliability features!

You can count the reasons for the popularity of this outstanding selection of all-steel closet systems. Smooth-gliding FLOAT-AWAY Closet Doors combine with color-matched side trim and adjustable shelves for clean decorative lines, complete reliability, low installed cost and minimum maintenance.

DISTINCTION BY DESIGN: Richly-sculptured FLOAT-AWAY Doors are deepformed for the look of expensive custom millwork. Adjustable, they allow for out-of-square construction and a $\frac{3}{4}$ " normal rug clearance. Luxurious panel designs ranging from classic to contemporary harmonize with room decor, provide elegant styling. The impressive depth of louvers and relief designs sets new standards of excellence and quality. Choice of standard or ceiling-high doors provides construction and decor options.

DURABILITY WHERE IT COUNTS: For eye-appeal and lasting protection, every FLOAT-AWAY Door is thoroughly bonderized, then completely plated—actually *electro-deposited*—with finest-quality enamel. Hard baking for 22 minutes (not 2 to 5) gives a beautiful, low-sheen Bone White coating that's exceptionally mar-resistant. Won't chip or crack even if the metal is hit sharply. All-over coating assures rust resistance even in hidden areas. Smooth matte finish is free from highlights or runs. Gleaming brass door pulls add deluxe quality touch. Pulls also available in antique bronze and satin aluminum.

LIFETIME CONSTRUCTION: For extra value, FLOAT-AWAY Bi-fold Doors and Shelves are fabricated from heavy 24-gauge cold-rolled enameled steel. High-strength, all-welded construction on doors assures trouble-free operation.

NOISELESS GLIDE: Superior engineering plus sound-dampening hardware give the finest in smooth, floating action. Doors glide open and closed quietly, effortlessly. Nylon-to-metal contacts plus sound-deadening material in back panel help eliminate noise. Sturdy hinges join panels for silent, smooth operation.

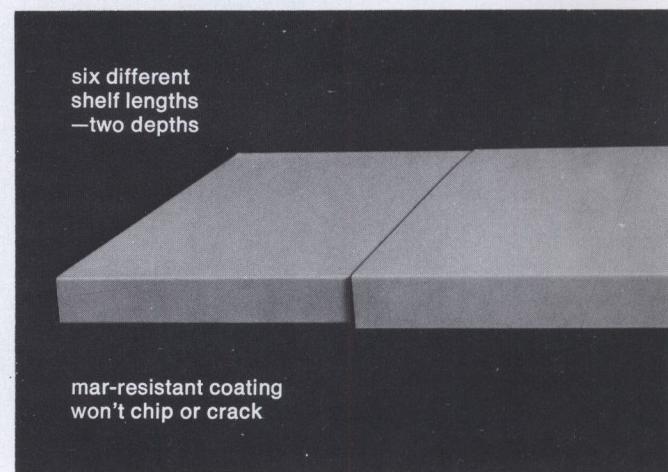
TWIN TRACKS: Identical top and bottom FLOAT-A-MATIC Guide Tracks can't cause confusion in installation. Made of rugged extruded aluminum, they won't deform if stepped on, provide permanently true tracks for free-floating action. What's more, the optional FLOAT-A-LEVEL top track compensates for irregularities in floors and ceilings. Bottom track allows door to open and close more rigidly—no shake, chatter, grab or twist like wooden or plastic doors. Nylon-tipped steel threaded guide pins assure extra quietness. Doors are full $1\frac{1}{8}$ " thick for superior sturdiness and quality appearance.

VERSATILE JAMB TRIM: Attractive jamb trim finishes opening for perfect installation without unsightly gaps at jambs. Choice of six widths—from 1" through $3\frac{1}{2}$ " in $\frac{1}{2}$ " increments—allows use of a standard door even if opening is oversize.

Here's PROOF of Value

- Quick installation
- Low cost (up to 50% less than wood)
- Decorator beauty
- Prefinished—complements every decor
- Adjustable height and width within opening
- Non-warping, no skin delamination, rust-resisting
- Quiet, effortless glide
- Permanent finish cleans easily—never needs paint

Matching Adjustable Shelves complete your closet system



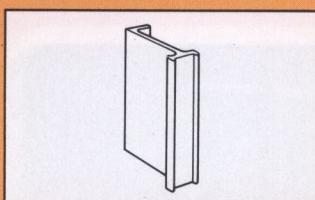
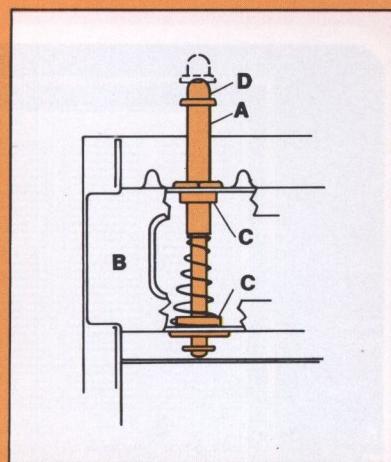
Sturdy steel shelves with mar-resistant enamel finish complement your FLOAT-AWAY Doors. See back cover.

Appealing Styles for All Interiors

Select the door of your choice from the following pages. Wide range of styling assures a perfect match for your decor—and each door features FLOAT-AWAY reliability.

Construction features of float-away Closet Doors

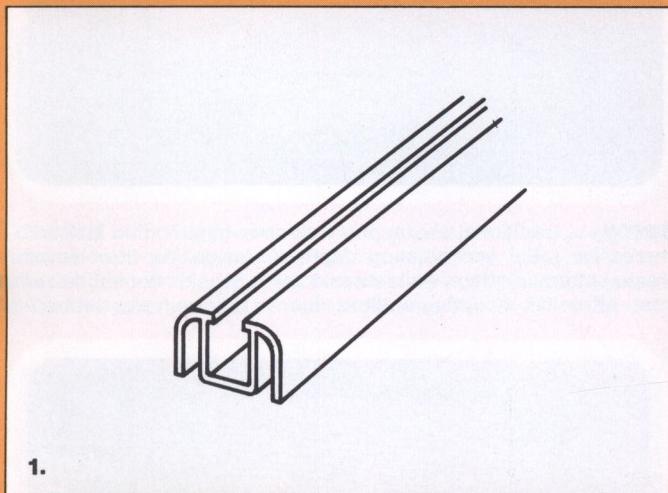
(A) Spring-loaded top pivot pins require no adjustment or tightening. (B) Stiffener braces at top and bottom have unique design that holds panels flush, reinforcing top and bottom edges against damage. (C) Nylon bushings in pivot and guide pin holes prevent wear, eliminate noise. (D) Nylon tips on guide pins assure smooth, silent operation.



Full mirror door handle features straight-line styling with full-finger grip for easy opening/closing. Choice of satin aluminum (standard) or satin gold finish.

Perfect-image glass with attractive pencil edges attaches securely with double mounting system: strong shock-absorbing tape and full width, top-and-bottom metal retainers.

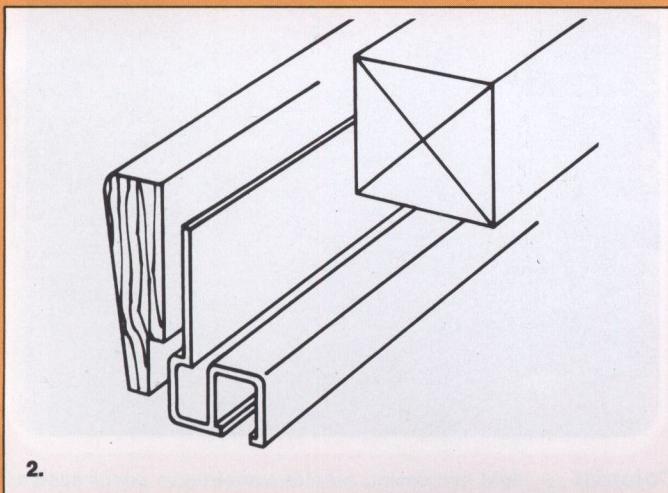
Versatile float-a-matic Tracks... meet all types of construction needs



1.

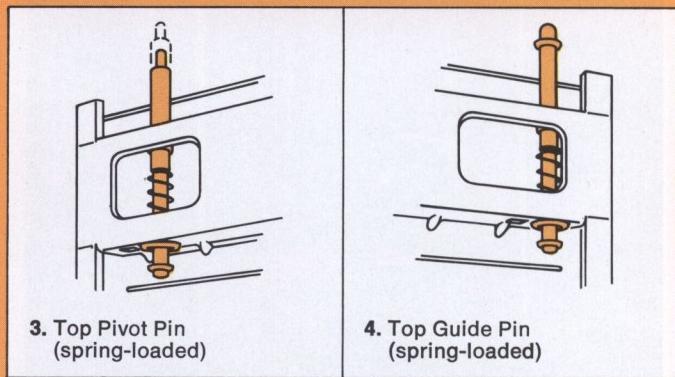
Extruded aluminum thresholds and top track with pivot bearings provide extra adjustment to meet any installation conditions.

float-a-level Track

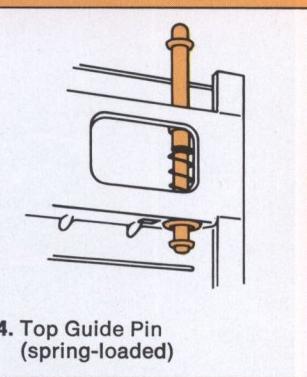


2.

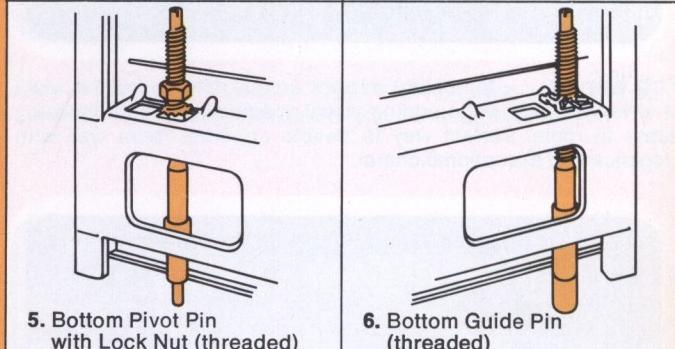
FLOAT-A-LEVEL Top Track of extruded aluminum solves problem of uneven floors and ceilings associated with poured concrete construction common to high-rise apartments and offices.



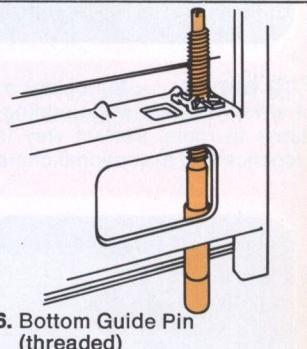
3. Top Pivot Pin
(spring-loaded)



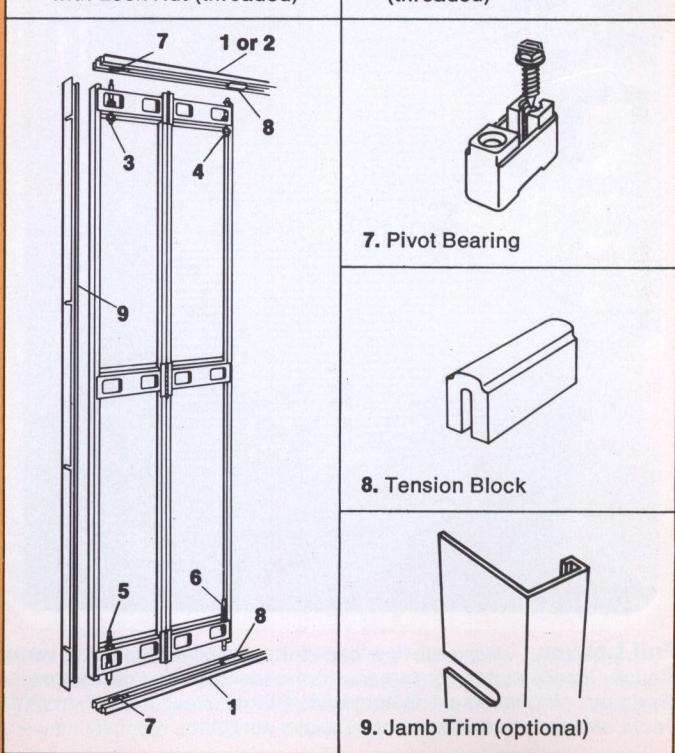
4. Top Guide Pin
(spring-loaded)



5. Bottom Pivot Pin
with Lock Nut (threaded)



6. Bottom Guide Pin
(threaded)

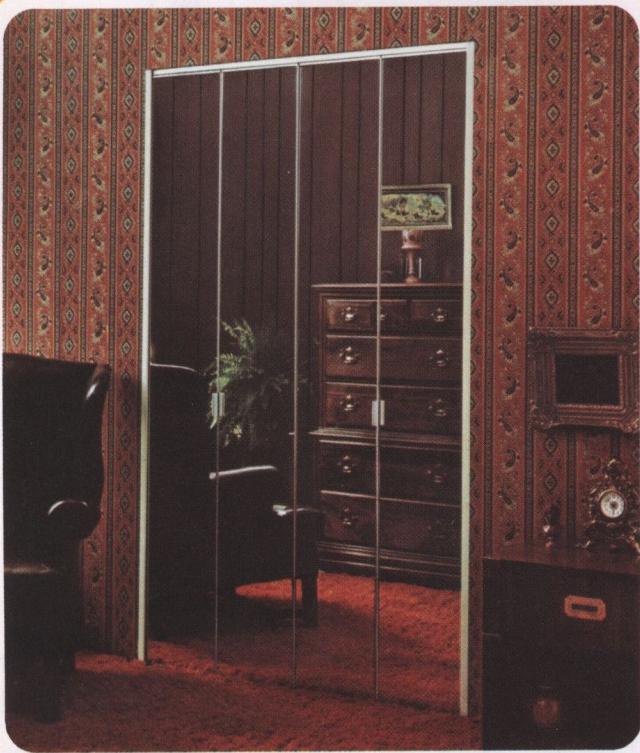


7. Pivot Bearing

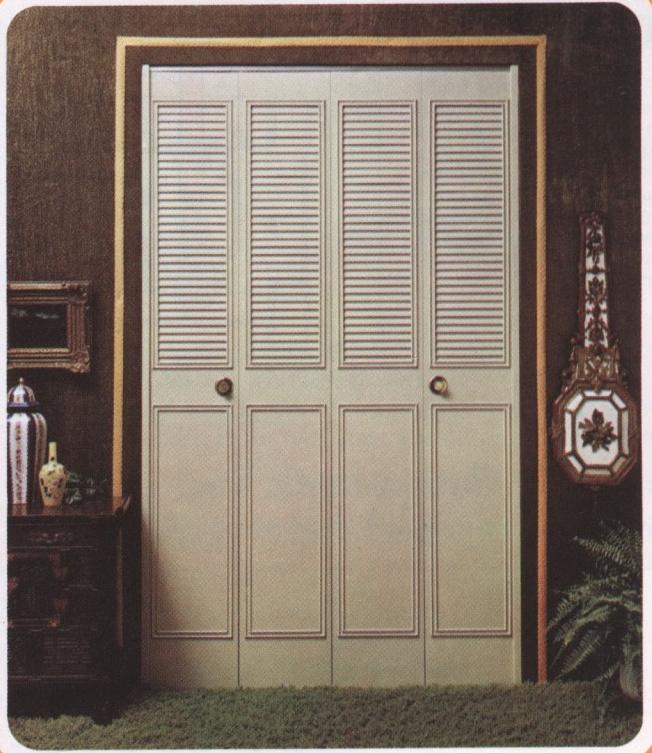
8. Tension Block

9. Jamb Trim (optional)

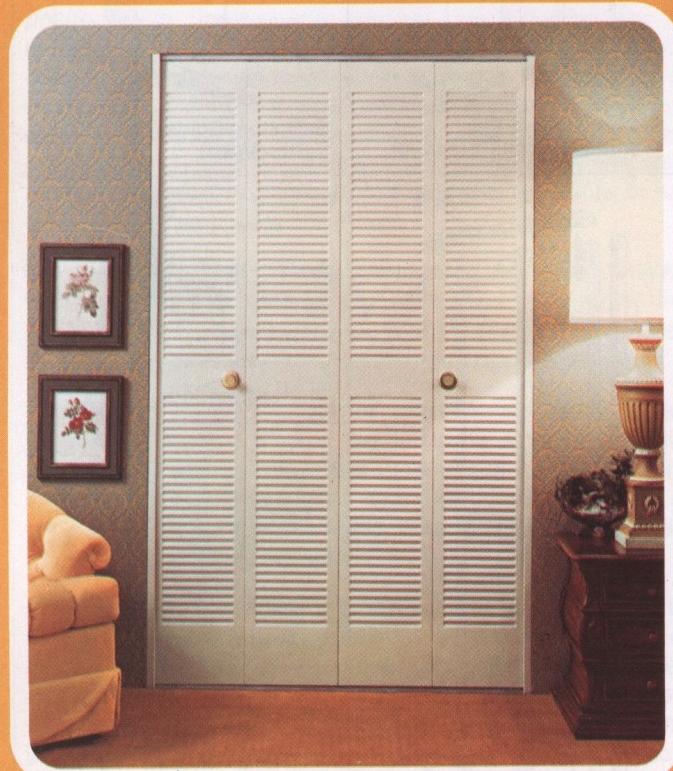
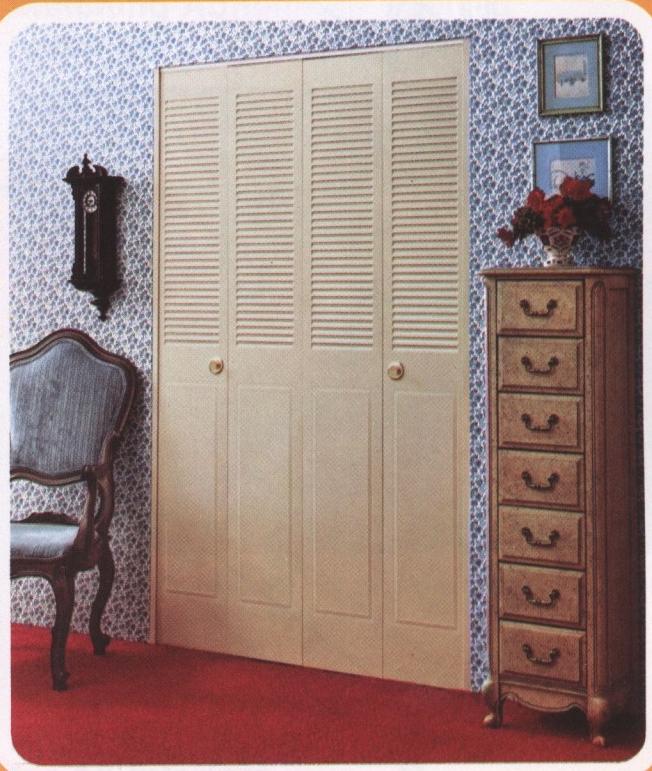
7 handsome door designs—authentic and distinctive



Full Mirror . . . full-height mirrors create richly reflective vista of silvery beauty, while adding visual spaciousness and imposing depth to room. Perfect way to double apparent room size with elegance and exceptional charm.

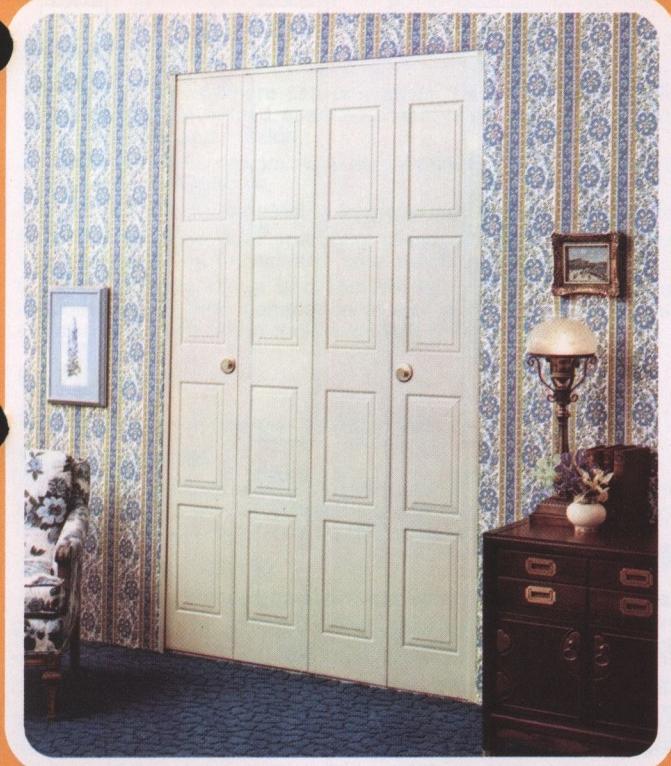


Savoy . . . traditional charm plus authentic handcrafted look with impressive relief accentuating depth of design. Air-flow louvers create patterned effect, while classic lower panels offer subtle contrast. Attractive moulding outlines door in picture frame setting.



Full Louver . . . large air-flow capability provides maximum ventilation. Ideally suited for furnace room, laundry area or wherever maximum air movement is required. Sturdy steel FLOAT-AWAY Doors assure fire resistance and rugged durability.

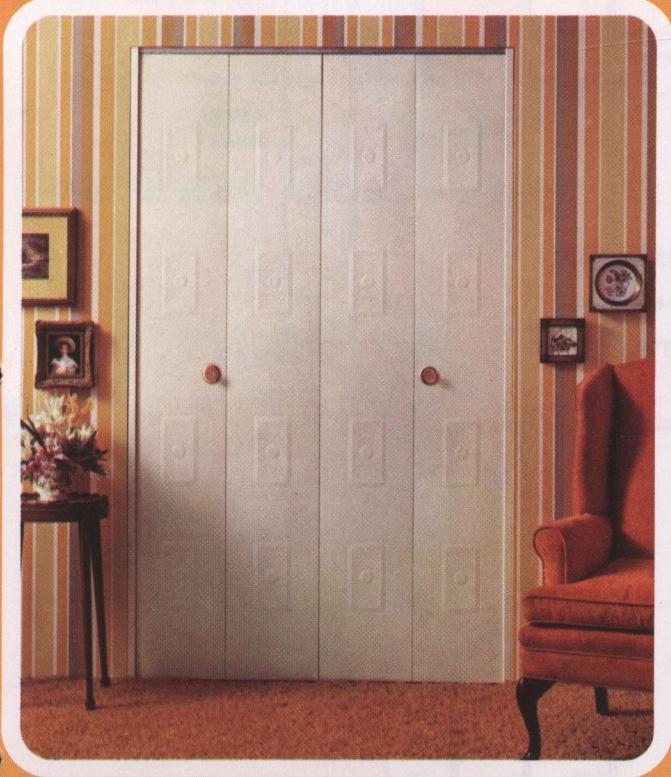
Colonial . . . light embossing creates unobtrusive panel design, while sturdy louvers allow free air-flow into closet. Ideal mating of beauty and function through attractive styling, durable construction, and superior design.



Concord . . . deeply-embossed doors resemble richly-carved wood, provide pleasing background for gracious living. Yet you save as much as 50% in installed costs over wooden doors—avoid callbacks due to warping, unsatisfactory operation.



Concord Door with optional attractive texturing in luxurious, leather-like finish. Enhances decor with extra touch of charm.



Georgetown . . . captures regal beauty of the past for contemporary enjoyment. Choice of standard or ceiling-high doors in this and other designs. Advantages of latter include increased usable shelf space and elimination of costly wall returns.



Flush . . . beautifully smooth surface continues uninterrupted expanse of wall line for effect of greater space. For custom decorating, cover surface with wallpaper, carpeting or original designs—newest styling mode for personalizing rooms!

float-away Bi-fold Closet Door Styles

Available with mirrors or as a full-mirror bi-fold door



Concord



Savoy



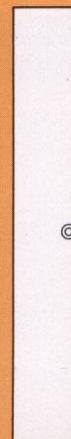
Mirror



Louver



Colonial



Flush



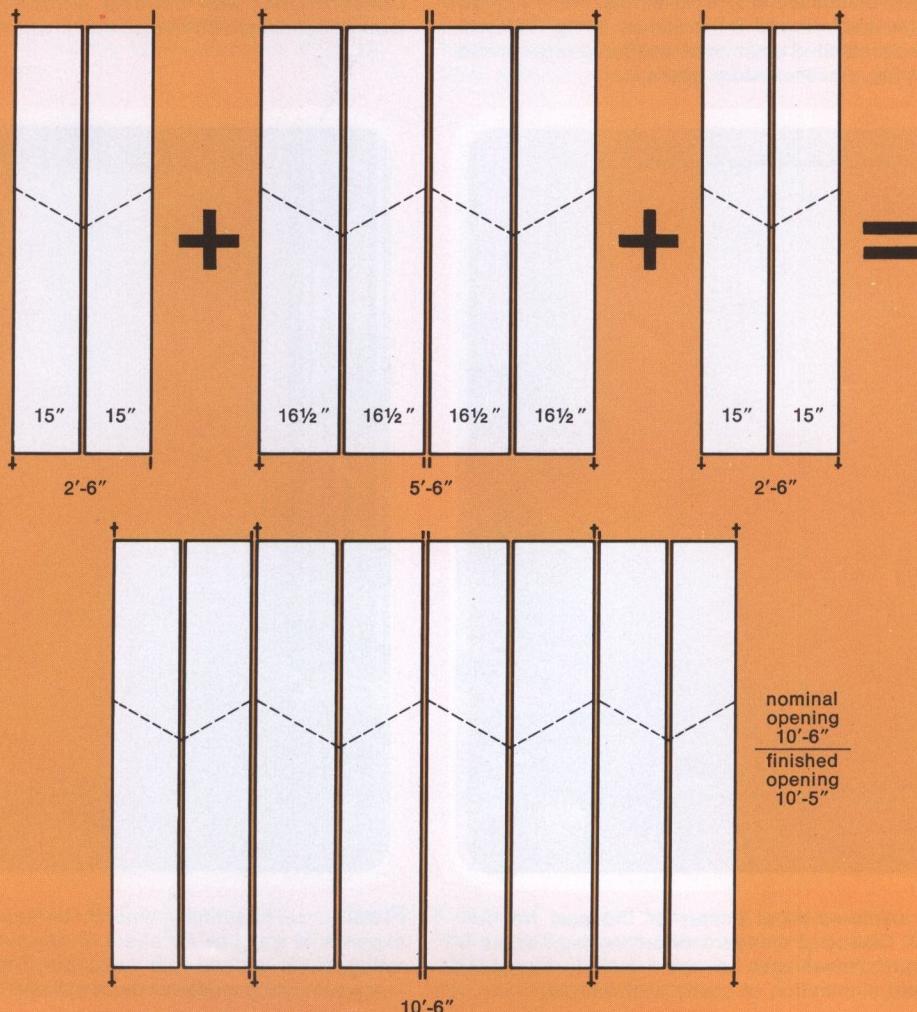
Georgetown

Door combinations for any opening

FLOAT-AWAY Doors fit virtually any opening width by using various combinations of 2-panel and 4-panel doors in multiple, in either identical or different sizes. Trim can compensate for slight construction inaccuracies and fractional width adjustments. Different designs can be intermixed in the same opening (especially Flush style with one of other designs), provided the arrangement is balanced in the

opening to present a symmetrical appearance.

Standard 2-panel doors are available in nominal widths from 1'6" to 3'0"; 4-panel from 3'0" to 6'0", all in 3" increments. Non-standard widths available on special order. Table (right) shows standard-size combinations for openings wider than 6'0". Normally 2-panel doors are recommended for 2'0" to 2'6" widths, 4-panel for 4'0" to 5'0".



Specify your closet system this easy way...

Architectural Specifications

notes to architect

- In coastal areas where salt content in the air is high, specify 24-ga. electro-galvanized enameled steel which offers increased protection against corrosion.
- FLOAT-A-LEVEL top track is recommended for attachment to poured concrete ceilings.
- Jamb trim should be used to improve the opening appearance.
- To insure proper door operation, tracks should be masked before spray-painting or installed after painting is completed.
- Do not remove doors and shelves from original packing for installation until after completion of wall and floor finishes. This assures items will retain their excellent finish and beauty.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by FLOAT-AWAY Div. of Kinkead Industries and shall be installed in accordance with its current printed directions.

1.3 delivery and storage

All material shall be delivered in the original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather, the building shall be heated and ventilated during installation of bi-fold doors and closet shelves to maintain temperature and ventilation consistent with good working conditions for finish work.

Part 2: products

2.1 materials

a. FLOAT-AWAY bi-fold closet doors:

- Material and finish: 24-ga. bonderized (carbon steel) (electro-galvanized steel) having all surfaces uniformly coated with one coat electro-deposited baked-on enamel in bone-white color.

- Style: (Concord) (Savoy) (Flush) (Louver) (Colonial) (Georgetown) (Full Mirror)⁽¹⁾ (Concord/Mirror)⁽¹⁾⁽²⁾ (Savoy/Mirror)⁽¹⁾⁽²⁾ (Flush/Mirror)⁽¹⁾⁽²⁾ (Louver/Mirror)⁽¹⁾⁽²⁾ (Colonial/Mirror)⁽¹⁾⁽²⁾ (Georgetown/Mirror)⁽¹⁾⁽²⁾ with sound-deadening properties.

⁽¹⁾Available with full-length mirror only.

⁽²⁾Mirror placed on lead panels only.

- Size: 2-panel width (1'6") (1'9") (2'0")* (2'3") (2'6")* (2'9") (3'0")*; 4-panel width (3'0") (3'6") (4'0")* (4'6") (5'0")* (5'6") (6'0")*; height (6'8") (8'0").

(Concord, Mirror style doors available only in asterisked widths.)

- Pivots and guides: bottom, threaded with lock nut and $\frac{7}{8}$ " maximum adjustability; top, spring-loaded.

- Knobs: (brass-standard) (aluminum) (antique bronze).

- Full mirror handles: (satin aluminum—standard) (satin gold).

b. Guide track:

Extruded aluminum, mill finish; top, (FLOAT-A-MATIC) (FLOAT-A-LEVEL) type; bottom, FLOAT-A-MATIC type.

c. Jamb trim:

24-ga. bonderized enameled steel finished to match doors, width (1") (1 $\frac{1}{2}$) (2") (2 $\frac{1}{2}$) (3") (3 $\frac{1}{2}$), height (6'8") (8'0").

d. Adjustable closet shelves

- Material and finish: 24-ga. bonderized enameled carbon steel having all surfaces uniformly coated with one coat electro-deposited baked-on enamel in bone-white color.

- Style: (clothing shelf with rod) (storage shelf) (linen shelf).

- Size: (clothing) (storage) shelves (12") (14") deep, (23 $\frac{1}{2}$ ")–(36 $\frac{1}{2}$ ") (35 $\frac{1}{2}$ "–48 $\frac{1}{2}$ ") (47 $\frac{1}{2}$ "–60 $\frac{1}{2}$ ") (59 $\frac{1}{2}$ "–72 $\frac{1}{2}$ ") (71 $\frac{1}{2}$ "–84 $\frac{1}{2}$ ") (83 $\frac{1}{2}$ "–96 $\frac{1}{2}$ ") adjustable width range; linen shelves 14" deep, (17 $\frac{1}{2}$ "–30 $\frac{1}{2}$ ") (29 $\frac{1}{2}$ "–42 $\frac{1}{2}$ ") adjustable width range.

- Off-Wall Bracket for (12") (14") deep shelves.

Part 3: execution

FLOAT-AWAY bi-fold doors, closet shelves and accessories shall be installed in accordance with current printed instructions of FLOAT-AWAY Division, Kinkead Industries.

float-away Closet Doors fit virtually any opening

STANDARD DOOR SIZES

DOOR SIZE	NO. OF PANELS	FINISH OPENING WIDTH	FINISH OPENING HEIGHT	DOOR SIZE	NO. OF PANELS	FINISH OPENING WIDTH	FINISH OPENING HEIGHT*
1'-6" x 6'-8"	2	18 $\frac{1}{2}$ "	80 $\frac{3}{4}$ "	1'-6" x 8'-0"	2	18 $\frac{1}{2}$ "	95 $\frac{1}{4}$ "
1'-9" x 6'-8"	2	21 $\frac{1}{2}$ "	80 $\frac{3}{4}$ "	1'-9" x 8'-0"	2	21 $\frac{1}{2}$ "	95 $\frac{1}{4}$ "
2'-0" x 6'-8" [†]	2	24 $\frac{1}{2}$ "	80 $\frac{3}{4}$ "	2'-0" x 8'-0" [†]	2	24 $\frac{1}{2}$ "	95 $\frac{1}{4}$ "
2'-3" x 6'-8"	2	27 $\frac{1}{2}$ "	80 $\frac{3}{4}$ "	2'-3" x 8'-0"	2	27 $\frac{1}{2}$ "	95 $\frac{1}{4}$ "
2'-6" x 6'-8" [†]	2	30 $\frac{1}{2}$ "	80 $\frac{3}{4}$ "	2'-6" x 8'-0" [†]	2	30 $\frac{1}{2}$ "	95 $\frac{1}{4}$ "
2'-9" x 6'-8"	2	33 $\frac{1}{2}$ "	80 $\frac{3}{4}$ "	2'-9" x 8'-0"	2	33 $\frac{1}{2}$ "	95 $\frac{1}{4}$ "
3'-0" x 6'-8" [†]	2	36 $\frac{1}{2}$ "	80 $\frac{3}{4}$ "	3'-0" x 8'-0" [†]	2	36 $\frac{1}{2}$ "	95 $\frac{1}{4}$ "
3'-0" x 6'-8"	4	36"	80 $\frac{3}{4}$ "	3'-0" x 8'-0"	4	36"	95 $\frac{1}{4}$ "
3'-6" x 6'-8"	4	42"	80 $\frac{3}{4}$ "	3'-6" x 8'-0"	4	42"	95 $\frac{1}{4}$ "
4'-0" x 6'-8" [†]	4	48"	80 $\frac{3}{4}$ "	4'-0" x 8'-0" [†]	4	48"	95 $\frac{1}{4}$ "
4'-6" x 6'-8"	4	54"	80 $\frac{3}{4}$ "	4'-6" x 8'-0"	4	54"	95 $\frac{1}{4}$ "
5'-0" x 6'-8" [†]	4	60"	80 $\frac{3}{4}$ "	5'-0" x 8'-0" [†]	4	60"	95 $\frac{1}{4}$ "
5'-6" x 6'-8"	4	66"	80 $\frac{3}{4}$ "	5'-6" x 8'-0"	4	66"	95 $\frac{1}{4}$ "
6'-0" x 6'-8" [†]	4	72"	80 $\frac{3}{4}$ "	6'-0" x 8'-0" [†]	4	72"	95 $\frac{1}{4}$ "

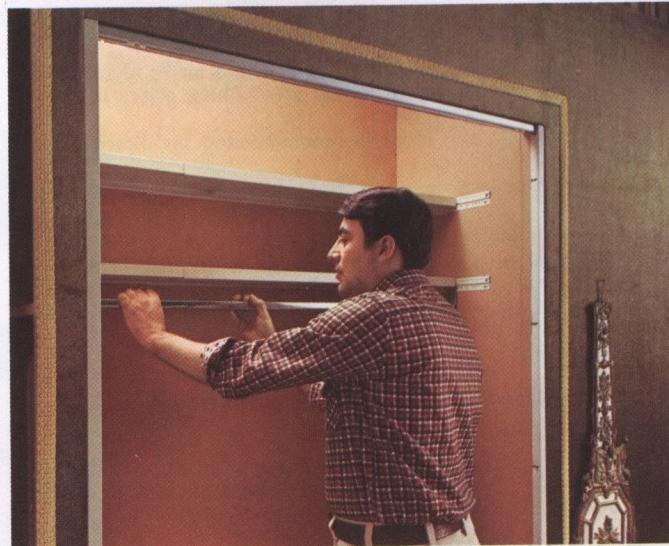
*For 7'-6" high doors, finish height is 89 $\frac{1}{4}$ ". [†]Concord and Mirror Doors available only in these sizes.

Adjustable Shelves... deluxe shelving for closet storage - at low cost!

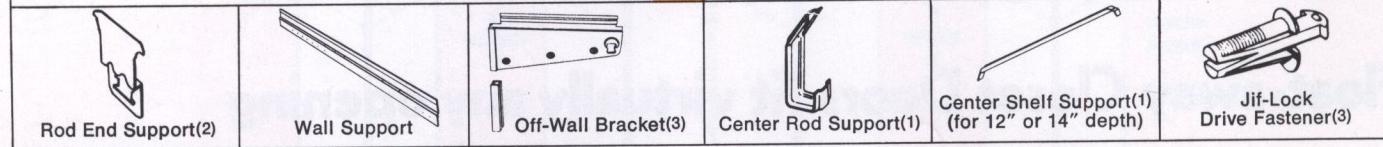
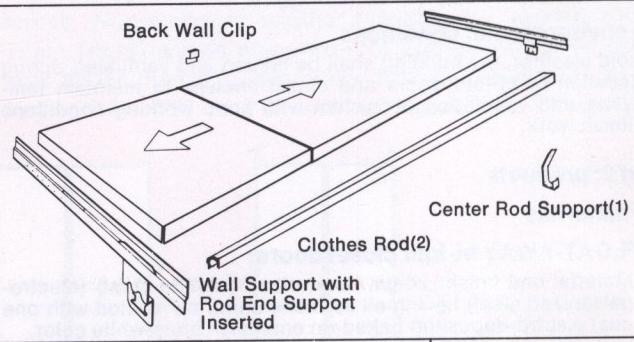
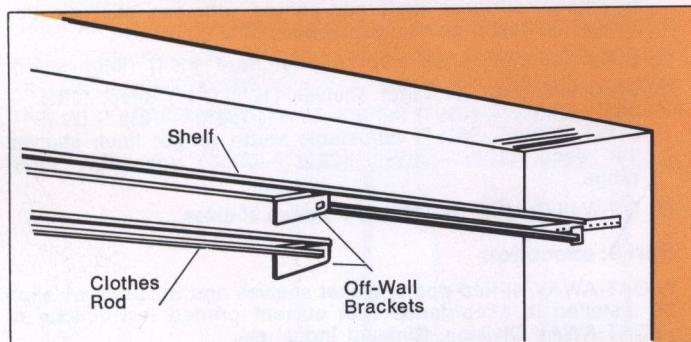
Perfect mate to FLOAT-AWAY Doors, these adjustable, all-steel shelves give you a completely integrated closet system. Sturdy prepainted shelves install in minutes with the smart look of decorator beauty. No cutting . . . no sawing . . . no fitting . . . no painting . . . no dangerous sharp edges—installation right now!

Plated bone white enamel finish matches FLOAT-AWAY Doors, has same lustrous, mar-resistant coating that won't chip or crack even if dented with a hammer. Adjustable shelves expand for precise fit . . . turn corners . . . mount in tiers . . . attain any continuous length desired . . . utilize full closet storage capacity.

Choice of six different shelf lengths, ranging from 24" to 96" (expanded), in selection of three types—clothing, storage and linen closet shelves. With Off-Wall Brackets, shelves connect together to any length required or allow positioning shelf between walls. Clothing and storage shelves available in 12" and 14" depths, 1½" thick. Linen shelves available in 14" depth, 5/8" thick. Heavily nickel-plated adjustable clothes rod adds luxury appearance, won't rust or tarnish, resists scratching by clothes hangers.



Easily-installed Adjustable Shelves and Rods quickly customize closet interiors for greater utility.



(1) Included with 60" to 72" and larger sizes.(2) Included with all clothing shelves.(3) Available separately. Sets are complete with all parts, fasteners.

Shelving sizes to fit all requirements

Clothing Shelves and Storage Shelves, in choice of 12" and 14" depths, are available with following minimum-maximum extension:

23½"–36½"	59½"–72½"
35½"–48½"	71½"–84½"
47½"–60½"	83½"–96½"

Linen Shelves, in 14" depth only, are available with the following minimum and maximum extension:

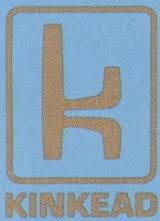
17½"–30½"
29½"–42½"

For further information, call or write:
KINKEAD INDUSTRIES INCORPORATED
1123 Zonolite Rd., N.E., Atlanta, Ga. 30306. Phone: (404) 875-8021
or 5860 N. Pulaski Rd., Chicago, Ill. 60646. Phone: (312) 463-7800.



**KINKEAD
INDUSTRIES**
INCORPORATED - CHICAGO 60646

Subsidiary of UNITED STATES GYPSUM COMPANY



KEWANEE
STEEL DOORS & FRAMES
with full flush seamless construction

8.2/Ke

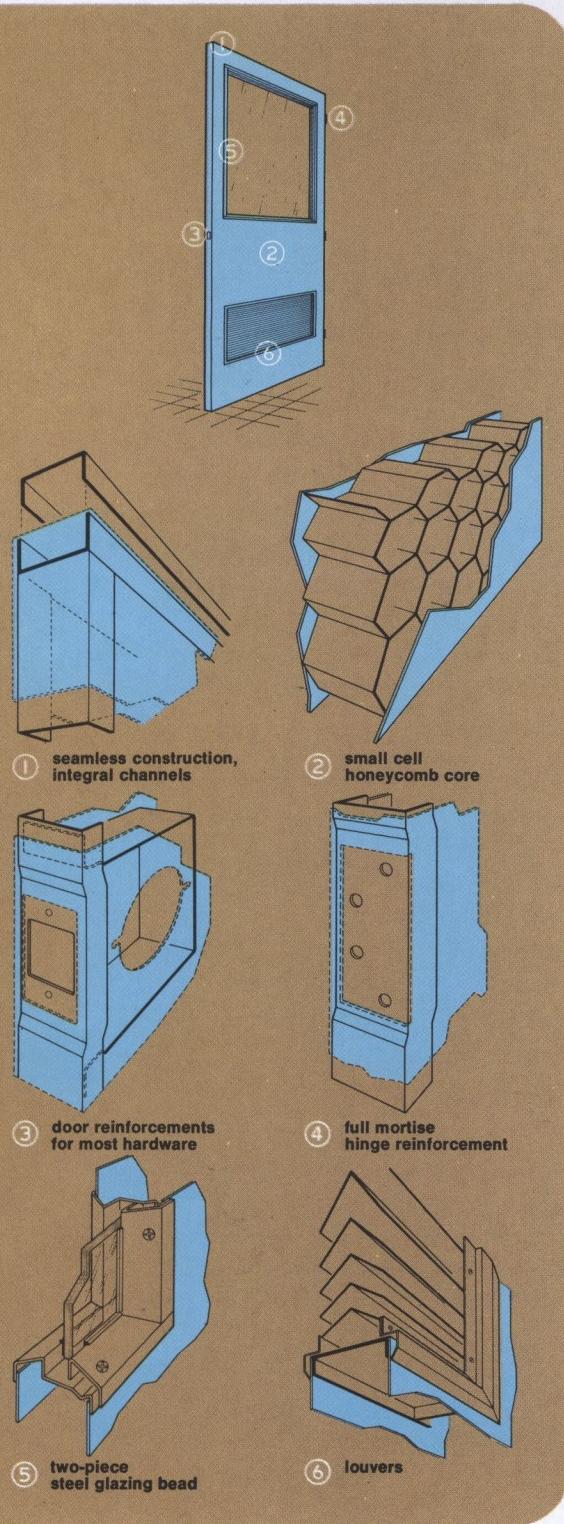


KEWANEE MFG. DIVISION
1976-1



METAL DOORS & FRAMES
hollow, flush, fire-rated

"QUALITY TO THE CORE" FEATURES OF KEWANEE STEEL DOORS



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**Types for every requirement;
styles for every preference ...**

- steel doors
- frames
- fire-rated doors & frames
- stick systems

Throughout the building industry, Kewanee is recognized for quality in its variety of honeycomb core, full flush *seamless* steel doors in standard and labeled types, styles and sizes. Offered with these are companion lines of both conventional and patented, quickly-installed frames plus architectural stick systems. The products suit apartments, motels, schools, hospitals and other buildings from industrial to monumental. All incorporate Kewanee built-with-care quality, precision fabrication and patented design features developed in a half-century of experience. Included are:

- Standard doors—series 400, 800
- Labeled doors—series ULH-400, FMH-400
- Frames—three series (F-Line, PAN-L-FIT, KWIK-FIT); labeled frames
- Styles and options to suit most requirements
- Stick systems—custom-fabricated for special entrances

Kewanee doors incorporate premium-quality construction and design features that pay off in long, trouble-free service, even under the most demanding heavy-duty usage.

Rugged construction

- **Full flush seamless construction**—all welds filled and ground smooth for fine appearance and moisture protection, yet competitive in cost
- **Small cell, phenolic honeycomb core**—adhesive bonding to skin sheets under heat and high pressure creates assembly that resists denting, reduces sound transmission and retains permanent flatness
- **20-, 18-, 16-ga. skin sheets**—thickness matched to impact and service
- **Integral hardware reinforcements**—full-length channels distribute stresses throughout door
- **Crisp edges, precision fabrication**—proper fit and smooth operation assured

Versatile function

- **Choice of finishes**—baked-on prime coat ready for finish-painting, three standard finish colors optional
- **Choice of hardware**—most brands compatible with standard door reinforcements
- **Wide variety**—sizes and styles for every requirement, many factory-stocked
- **Fire ratings**—doors and frames labeled in both UL and FM classifications
- **Clean, finished glazing**—two-piece steel glazing bead installs fast
- **Frames for every wall**—patented features provide 5-min. installation *after* the wall is up

Local service

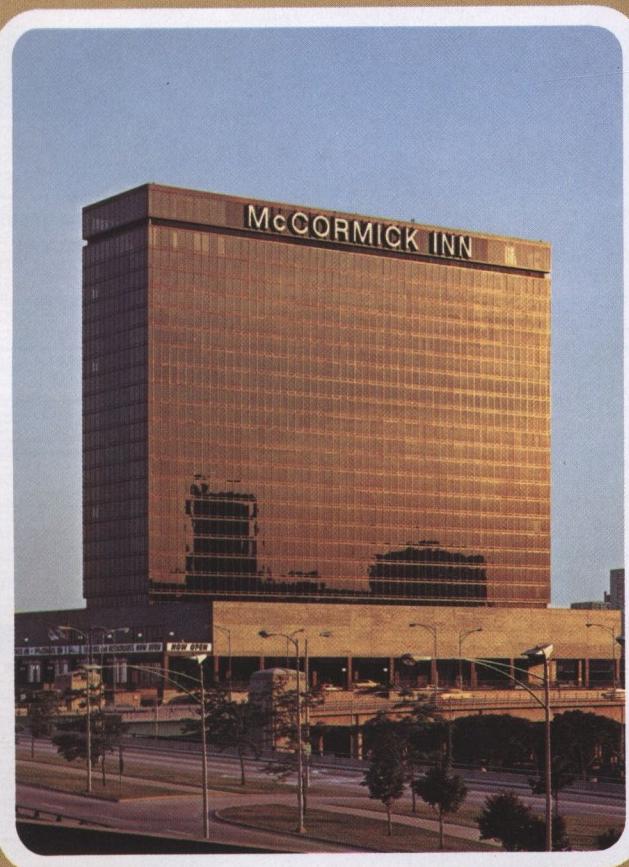
- **Dealer stocks**—most standard doors and frames
- **Custom fabrication**—architectural stick systems and special conditions
- **Dealers factory-trained**—Kewanee expertise locally available for consultation



HARBOR POINT CONDOMINIUM
Architects: SOLOMON, CORDWELL, BUENZ & Assoc., Inc.



McCLURG COURT CENTER
Architects: SOLOMON, CORDWELL, BUENZ & Assoc., Inc.



MCCORMICK INN
Architects-Engineers: A. EPSTEIN & SONS, Inc.
Associate Architect: JOHN HEINRICH, AIA



EUGENIE SQUARE
Architects-Engineers: DUBIN, DUBIN, BLACK & MOUTOUSSAMY

doors

description

Kewanee standard doors are offered in Series 400 and 800, 1 3/4" and 1 5/8" thick, respectively. Series 400 is available in 20-, 18-, or 16-ga. skin thicknesses, and with labels for fire-rated requirements, Series 800 with 20-ga. skin sheets only. The last two digits in each door number indicate skin sheet gauge. All are supplied with cut-out and fully factory-reinforced, drilled and tapped for lockset and hinges, reinforced only for surface-mounted closer (except Series 820). All 6'8" high doors prepared for cylindrical lockset are reversible, others are handed. All doors are available with zinc-coated steel skin sheets on special order. Steel, screw-attached glazing beads are supplied in a bevel profile with glazed styles.

Pairs of doors are supplied with right-hand leaf active and prepared for lock, inactive leaf reinforced for top and bottom surface bolts and prepared for ASA115.1 strike plate. Astragals furnished as standard with UL-labeled pairs only.

Standard options available include: preparations for surface-mounted closers (on Series 820), door holders, flush bolts on inactive leaves and panic hardware, steel flush top and bottom channels, special marking and louvers.

series selection & use

Series 400 Doors are suitable for either exterior or interior use, with the choice of skin sheet gauge dependent on frequency of use and degree of impact resistance required.

Series 416 doors should be used where subjected to both frequent use and high impact, such as main entrances to public buildings; Series 418 where impact is less severe and frequency moderate to high, as in most interiors; Series 420 where impact and abuse are light and frequency of use moderate.

Series ULH-400 and FMH-400 Labeled Doors, for fire-rated locations where UL or FM labels are required, should also be selected according to the criteria above unless the label requires a greater minimum.

Series 820 Doors are intended only for interiors, and for low-frequency use where impact and abuse are light. Closet and utility room doors are examples of ideal applications.

Select the appropriate door series and style for each door opening. See chart on page 5 for complete listing of sizes available, also Label Door Selector chart on page 7 for availability of sizes and styles qualifying for various labels.

styles

Shown here are various Flush, Decor, Vision, Glass, Narrow Light and Dutch door styles available in all series—a style for virtually every requirement. Styles D1 through D5 are actually M Style doors with mouldings surface-applied by the Kewanee dealer.

door physical data

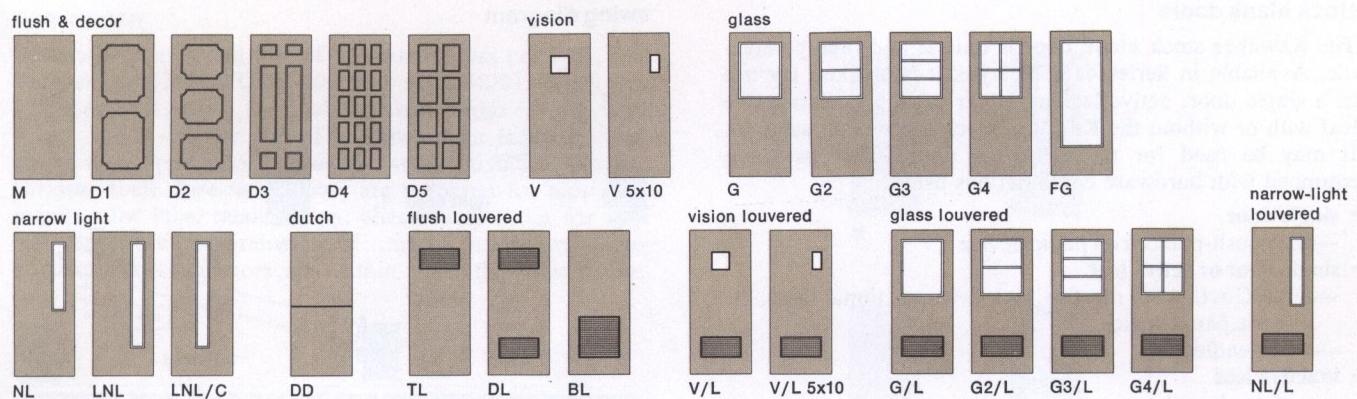
description	series 420 418 416	series ULH-420 ULH-418 ULH-416	series FMH-420 FMH-418 FMH-416	series 820
door sizes/styles	(see Door Avail. chart)	(see Door Avail. chart)	420/418/416 single doors 418/416 door prs. in qualifying sizes, M style (see Door Avail. chart)	(see Door Avail. chart)
labels	none	UL: A,B,C,D,E	FM: 3/4, 1 1/2, 3 hr.	none
thickness	1 3/4"	1 3/4"	1 3/4"	1 5/8"
skin sheets (ga.)	20, 18, 16	20, 18, 16	20, 18, 16	20
perimeter channels (ga.)	14	14	14	16
standard template hinge reinforcement (1)	1 1/2 pr. 4 1/2" x 4 1/2"	1 1/2 pr. 4 1/2" x 4 1/2"	1 1/2 pr. 4 1/2" x 4 1/2"	1 1/2 or 1 pr.(1) 3 1/2" x 3 1/2"
lock reinforcements	Govt. #161 or Govt. #86	Govt. #161 or Govt. #86	Govt. #161 or Govt. #86	Govt. #160
lock edge bevel	1/8" in 2"	1/8" in 2"	1/8" in 2"	square
clearances	(2)	(2)	(2)	(2)
finish	(3)	(3)	(3)	(3)
glazing beads	steel, screw-attached, bevel profile	steel, screw-attached, bevel profile	steel, screw-attached, bevel profile	steel, screw-attached, bevel profile
compatible frames	F418, F416 PF418, PF416	ULF-416 ULPF-416	FM416	F818 PF818

(1) 1 1/2 pr. all doors, except 1 pr. Series 820 door 6'8" high. (2) All doors: sill 3/4", head 1/2", hinge stile lock stile 1/8". (3) Standard finish: cleaned, phosphatized, baked-on gray enamel prime coat; finish coat available in Dark Bronze, Beige, Autumn Brown and Black on quantity orders (contact Kewanee for required minimum).



KEWANEE
STEEL DOORS AND FRAMES
KINHEAD

8.2/Ke



door availability/glass sizes(1)

door (2) size ↓	style →	flush	vision		glass					narrow light			dutch
		M	V	V 5x10	G	G2	G3	G4	FG	NL	LNL	LNL/C	DD
6'8" high													
2068	(no glass)				12x28	12x28	12x57 1/8						
2468					16x28	16x28	16x57 1/8						
2668					18x28	18x28	18x57 1/8						
2868					20x28	20x28	20x57 1/8						
3068					24x28	24x28	24x57 1/8						
3468					28x28	28x28	28x57 1/8						
3668					30x28	30x28	30x57 1/8						
3868					32x28	32x28	32x57 1/8						
4068					36x28	36x28	36x57 1/8						
7'0" high													
2070	(no glass)				12x32	12x32	12x61 1/8						
2470					16x32	16x32	16x61 1/8						
2670					18x32	18x32	18x61 1/8						
2870					20x32	20x32	20x61 1/8						
3070					24x32	24x32	24x61 1/8						
3470					28x32	28x32	28x61 1/8						
3670					30x32	30x32	30x61 1/8						
3870					32x32	32x32	32x61 1/8						
4070					36x32	36x32	36x61 1/8						
7'2" high													
2072	(no glass)				12x34	12x34	12x63 1/8						
2472					16x34	16x34	16x63 1/8						
2672					18x34	18x34	18x63 1/8						
2872					20x34	20x34	20x63 1/8						
3072					24x34	24x34	24x63 1/8						
3472					28x34	28x34	28x63 1/8						
3672					30x34	30x34	30x63 1/8						
3872					32x34	32x34	32x63 1/8						
4072					36x34	36x34	36x63 1/8						
8'0" high													
2080	(no glass)				12x44	12x44	12x73 1/8						
2480					16x44	16x44	16x73 1/8						
2680					18x44	18x44	18x73 1/8						
2880					20x44	20x44	20x73 1/8						
3080					24x44	24x44	24x73 1/8						
3480					28x44	28x44	28x73 1/8						
3680					30x44	30x44	30x73 1/8						
3880					32x44	32x44	32x73 1/8						
4080					36x44	36x44	36x73 1/8						

(1) Size in inches, exposed glass area (not actual pane size). (2) Pairs of doors available on same basis as single doors of same size/style door leaf.

doors

stock blank doors

The Kewanee stock blank door is unique and highly versatile. Available in Series 418, M style, it is stocked for use as a single door, active leaf of a pair of doors, or inactive leaf with or without the Kewanee stock conversion astragal. It may be used for the following door functions when equipped with hardware combinations listed:

- **single door**
—with push-pull or rim panic device
- **single door or active leaf**
—with Govt. #86 mortise lock with sectional trim, or mortise panic device
—with deadlock
- **inactive leaf**
—with push-pull or rim panic device
—with ASA flush bolts, and ASA 115.1 or deadlock strikes
—with surface bolts

handing

Door hand is determined by noting hinge location when door opens *away* from viewer, i.e. if hinge jamb is on his right, it is a right-hand door. In the case of pairs of doors, hand is determined from the *active leaf* in the same way. Door hand, as determined above, must be specified on orders.

Proper handing for *hardware* is determined in the same way, but by viewing from the *security* or keyed side. If the door opens *away* from the viewer as before, handing is identical; if door opens *toward* viewer, handing changes and hardware must be ordered for a "reverse bevel" door. Thus, a "right-hand" door is, for hardware purposes a "left-hand reverse bevel" door, and vice versa. This paradox occurs whenever the *security* side of a door opens *toward* the viewer. The security side of a communicating door is the side from which hinges are not visible when door is closed; for bathroom, bedroom and closet doors, security is on the room side.

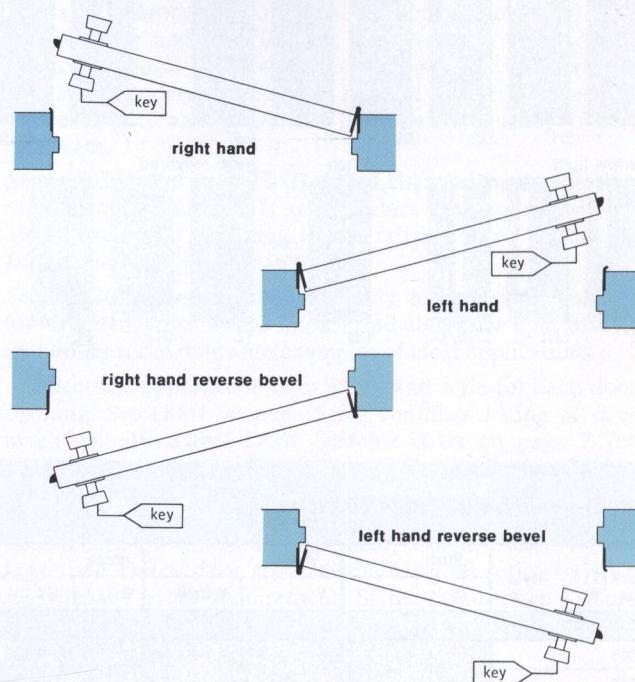
louvers

Kewanee offers both commercial and pierced louvers for all door series, in two standard sizes of each type. Other sizes are available on special order. They can be furnished in standard doors of sizes and styles indicated in the Door Availability chart on page 5, and UL- or FM-labeled doors as qualified in Label Door Selector chart on page 7. See chart below for free air area and sizes.

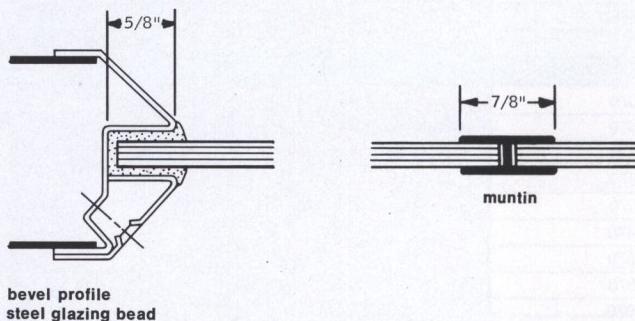
louver physical data

louver		door size	free air area (sq. in.)
type	size		
commercial	2'w. x 2'h.	see Door Avail. chart	374
	2'w. x 1'h.		137
pierced	14"w. x 7'h.	2'4"w. min.	30
	8"w. x 7'h.	2'0"w.	17

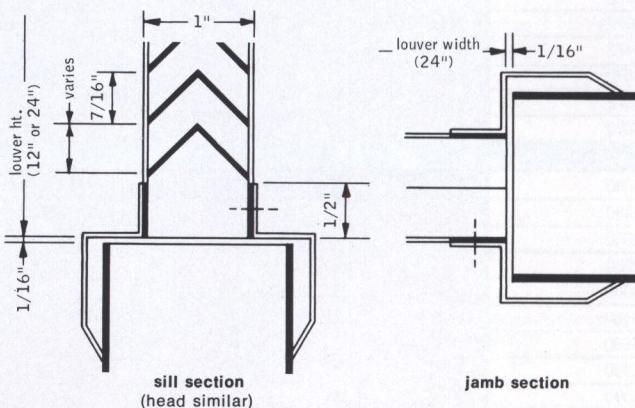
swing diagram



glazing details



commercial louver details



fire-rated doors

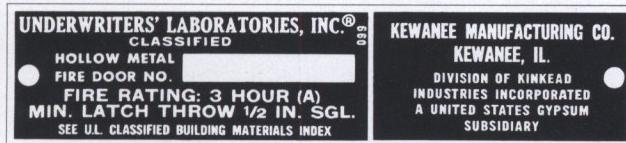


KEWANEE
STEEL DOORS AND FRAMES

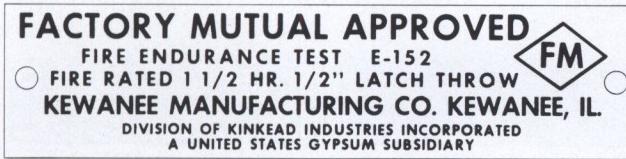
8.2/Ke

description

Kewanee offers a full line of fire-rated doors both UL and FM labeled (Series ULH-400 and FMH-400). They are available in A, B, C, D, E label classifications for UL, and 3, 1½, or ¾-hr. for FM. The Label Door Selector chart shows door applications, sizes and styles qualifying for the various labels. Fire-rated doors are prepared for hardware required for label qualification; check local codes for specific hardware requirements of various labels and door applications. Clearances are within fire-rated door limits.

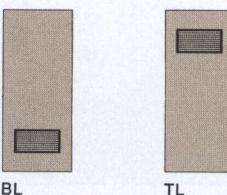
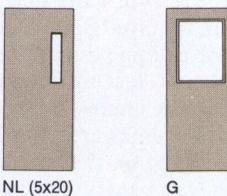
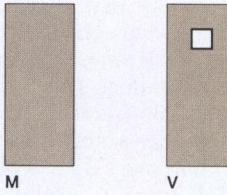


**KEWANEE MANUFACTURING CO.
KEWANEE, IL.**
DIVISION OF KINKEAD
INDUSTRIES INCORPORATED
A UNITED STATES GYPSUM
SUBSIDIARY



label door selector(1)

	class A (3-hr.)	class B (1½-hr.)	class C (¾-hr.)	class D (1½-hr.)	class E (¾-hr.)
door style	Uses: In walls separating buildings; high-hazard storage & process areas	Uses: Vertical shaft enclosures such as stairwells, elevators & trash chutes	Uses: Corridors & room partitions	Uses: Exterior walls with severe fire exposure on outside	Uses: Exterior walls with moderate fire exposure on outside
single door (non-louvered)					
M	418/416: 4080 max.	418/416: 4080 max.; 420:3872 max.	418/416:4080 max.; 420:3872 max.	418/416:4080 max.	418/416:4080 max.; 420:3872 max.
V	—			—	
NL (5x20)	—			—	
G	—	—	418/416: 4080 max.; 420:3872 max.	—	420/418/416:4080 max., with max. 720 sq. in. exposed glass
single door (louvered)					
BL	—	418/416:3676 max.; 420:3672 max.	418/416:3676 max.; 420:3672 max.; 24x24 louvers, max.	—	—
TL	—			—	—
pair of doors (non-louvered only, louvered do not qualify)					
all styles	same as single door except 7472 max.	same as single door except 420 does not qualify	same as single door except 420 does not qualify	same as single door except 420 does not qualify	same as single door except 420 does not qualify



(1) Door qualifications shown are based upon UL limitations which include the following:

Max. exposed glass area—Classes A & D, none allowed; Class B, 100 sq.-in./light; Class C, 1296 sq.-in./light; Class E, 720 sq.-in./light; Classes B & C, louvers may be used in place of glazing (not both). Lock throw—½" or ¾" on single doors, ¾" only on pairs of doors.

See Underwriters Laboratories Building Materials List for complete UL limitations, also local code restrictions on fire-rated doors, frames, hardware, glass and accessories.

frames

description

Kewanee frame design effectively mates door with wall. Frames are built to the same high standards of design, materials and workmanship as Kewanee doors, assuring precise door fit and smooth operation. This has resulted in three versatile series of steel door frames: PAN-L-FIT and SP/KWIK-FIT Frames, with labor-saving patented design features to simplify installation, and F-Line Frames.

Both PAN-L-FIT and SP/KWIK-FIT Steel Door Frames are designed for installation into panel-type walls—*after* the walls are in place. Only four screws or nails, and five minutes or less of installation time are required per frame. There are no cost-incurring buck-ups or ceiling struts to install, or obstruct the working area; no time lost to plumb the frame. Instead of building the wall to the frame, as is usually done, PAN-L-FIT and SP/KWIK-FIT Frames are installed *after* the wall is completed. An extra return on the backband permits installation without gouging wall panels. Fitting wall panels into frames, especially troublesome when close together or

near corners, is eliminated. Cutting rough door openings is simplified: panels are cut to the opening *after* being placed. Since frames don't interfere with wall erection, the result is better-built walls with a minimum of patches and taped joints. A plumb, true and square door opening is assured (critical to pre-machined doors) and with less reliance on mechanics' skills.

The key to the efficient PAN-L-FIT and SP/KWIK-FIT Frame installation is the patented compression lug. After installation of hinge jamb, head and strike jamb in sequence, the lug simultaneously locks the miters and secures the frame in place by the twist of a single compression screw.

PAN-L-FIT Frames are intended for panel-type walls of all types, SP/KWIK-FIT Frames only for drywall construction—exceptionally economical installations. F-Line frames are available, with several types of anchorage, for all types of wall construction.

frame physical data

description	F-Line					PAN-L-FIT					SP/KWIK-FIT		
	F416	F418	ULF416	FM416	F818	PF-416	PF-418	ULPF-4	PF-818	P18	SP/KF-4	SP/KF-8	SP/K
type													
labels available	—	—	X	X	—	—	—	X	—	—	—	—	—
swing door	sgl. door	X	X	X	X	X	X	X	X	—	X	X	—
	pr. of doors	X	X	X	X	X	X	—	X	—	X	X	—
cased opening	casing only	X	—	—	—	—	—	—	—	X	—	—	X
	w/slid. door hdwe.	—	—	—	—	—	—	—	—	—	—	—	(8)
communicating (sgl. doors)		X	X	X	X	X	X	—	X	—	—	—	—
double egress (pr. of doors)		—	—	X	—	—	—	—	—	—	—	—	—
transom (sgl., pr. of doors)		X	—	X	X	—	X	X	—	—	—	—	—
construction													
integral type	X	X	X	X	X	X	X	X	X	X	X	X	X
metal thickness (ga., exc. as noted)	16	18	16	16	18	16	18	16	18	18	.027"	.027"	.027"
reinforcements	hinge	4½x4½, 7-ga.				(1)	4½x4½, 7-ga.				(1)	—	(6)
	strike (2) (3)	(2)	(2)	(2)	(2)	(3)	(2)	(2)	(2)	(3)	—	(7)	(7)
strike plates	none furnished					none furnished					—	X	X
optional preparations	door closer	surface-mtd. reinforcing only					surface-mtd. reinforcing only					not recommended	
	door holder	surface-mtd. reinf. to template					surface-mtd. reinf. to template					—	—
	flush bolt	ASA 115.4 conformance					ASA 115.4 conformance					—	—
	panic hdwe.	mortise, rim or vertical rod reinforced										—	—
type assembly	KD (interlocking tabs) or welded					KD (no tabs needed)					KD (no tabs needed)		
optional finish (4)	none					fin. coat: dark bronze, beige, autumn brown, black					fin. coat: dark bronze, beige, aut. brown, black		

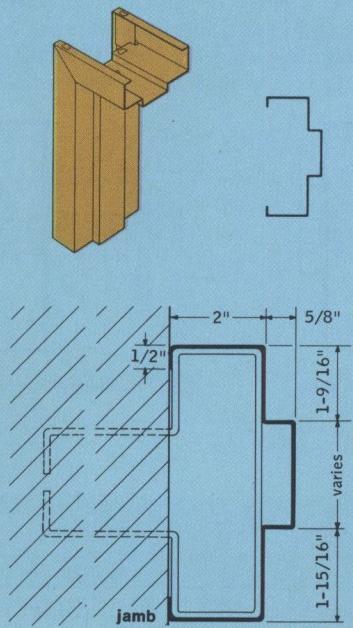
(1) 3½"x3½", 11-ga.; 1 pr. for 6'8" high, 1½ pr. for other. (2) 14-ga. ASA 115.1, 4¾". (3) 14-ga. ASA 115.3, 2¾". (4) Subject to minimum quantity of one color (contact Kewanee); standard finish is cleaned, phosphatized and baked-on gray enamel prime coat, except SP/KWIK-FIT Series which is standard zinc-coated steel. (5) Punched and embossed for 1 pr. 3½"x3½". (6) Punched and embossed for 1½ pr. 3½"x3½". (7) Punched, embossed and provided with brass strike plate in aluminum, bronze or chrome finish. (8) With sliding door hardware becomes SP/KWH Frame, see Frame Availability chart.



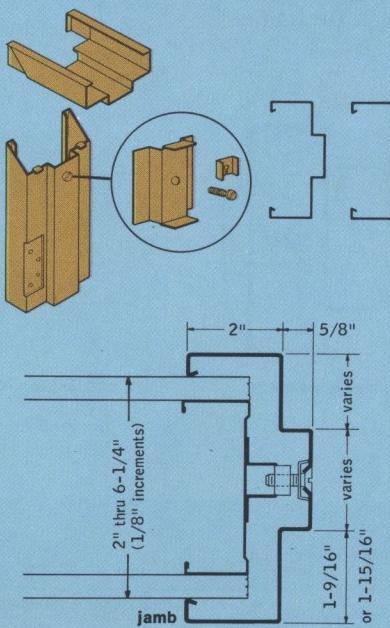
KEWANEE
STEEL DOORS AND FRAMES

8.2/Ke

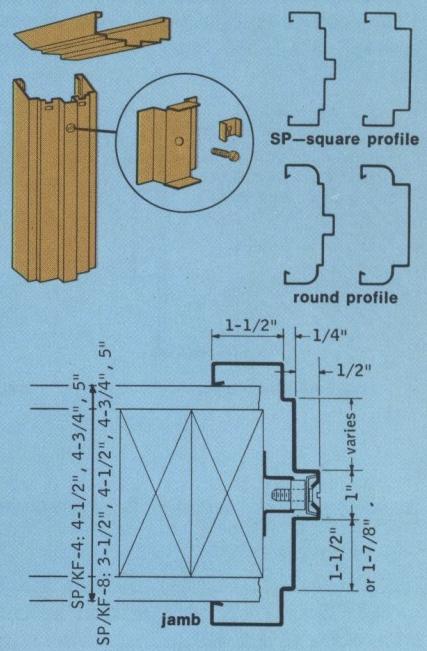
F-Line



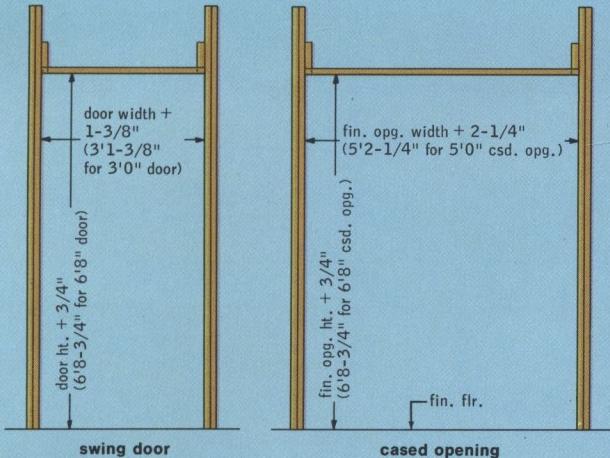
PAN-L-FIT



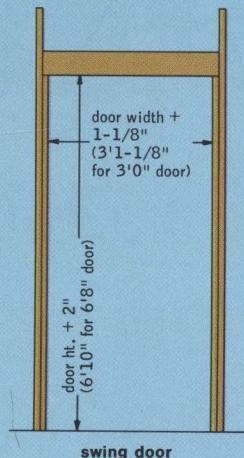
SP/KWIK-FIT



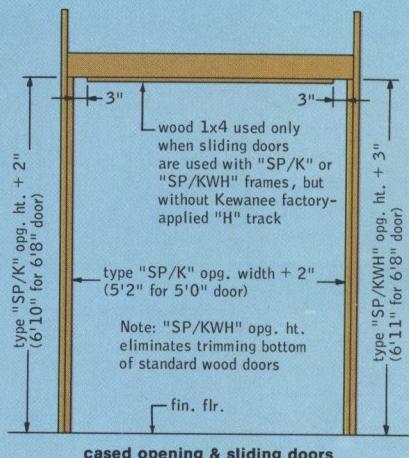
PAN-L-FIT frames



rough openings



SP/KWIK-FIT frames



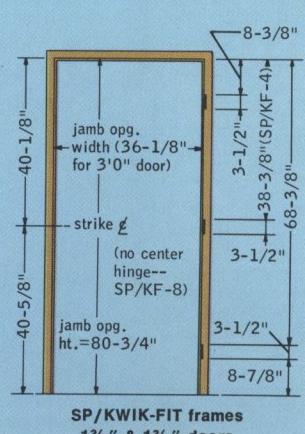
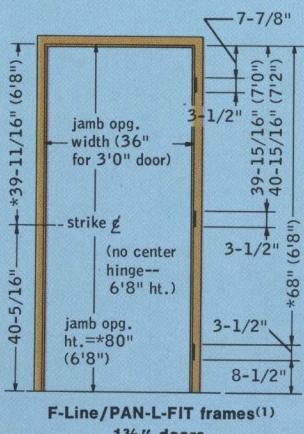
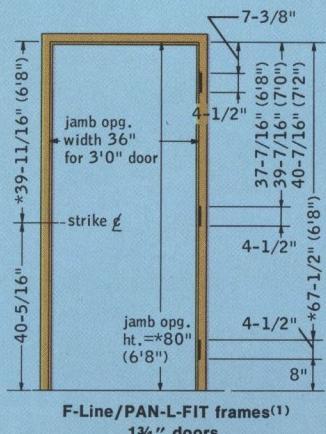
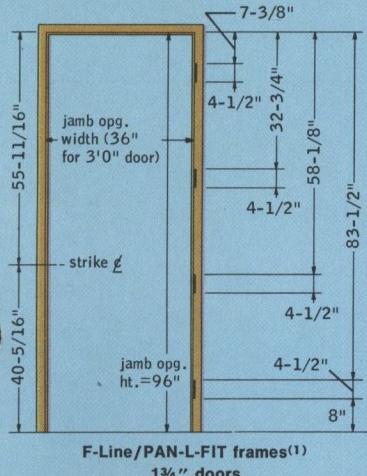
swing door

cased opening

swing door

cased opening & sliding doors

strike & hinge locations



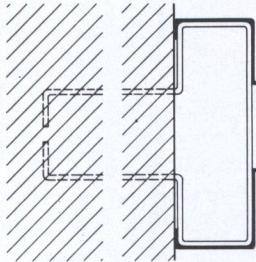
(1)Dimensions for 6'8" to 7'2" heights or as noted;

(*)Indicates 6'8" height dimensions which increase 4" and 6", for 7'0" and 7'2" heights, respectively.

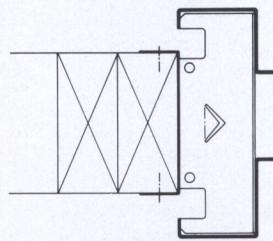
frames & anchorage

anchor clips

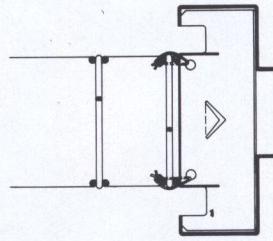
Kewee offers various types of anchors for tying in F-Line Frames to all types of wall construction, available for frames of 4 $\frac{3}{4}$ ", 5 $\frac{3}{4}$ ", 6 $\frac{3}{4}$ " and 8 $\frac{3}{4}$ " jamb depths.



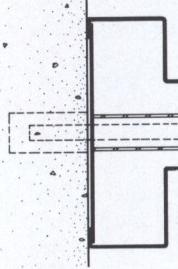
masonry wire anchor



#A3285 anchor—wood studs



#A3285 anchor—TRUSSTEEL® studs



UL concrete anchor

frame availability⁽¹⁾—jamb depths/wall thicknesses (in., nom.)

frame series door leaf size (1)	F-Line frames (jamb depth)					PAN-L-FIT frames (wall thickness) (3)					SP/KWIK-FIT frames (wall thickness)			
	1 $\frac{3}{4}$ " doors				1 $\frac{3}{8}$ " doors	1 $\frac{3}{4}$ " doors				1 $\frac{3}{8}$ " doors	cased opg.	1 $\frac{3}{4}$ " doors	1 $\frac{3}{8}$ " doors	cased opg.
	F416	F418	ULF416	FM416	F818	PF416	PF418	ULPF-4	PF-818	P18	SP/KF-4	SP/KF-8	SP/K, SP/KWH (2)	
6'8" frame														
2068														
2468	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	5 $\frac{3}{4}$	2 to 6 $\frac{1}{4}$	2 to 6 $\frac{1}{4}$	2 to 6 $\frac{1}{4}$	4 $\frac{1}{2}$	3 $\frac{3}{8}$	—	
2668	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	6 $\frac{3}{4}$	8 $\frac{3}{4}$				4 $\frac{3}{4}$	4 $\frac{1}{2}$	—	
2668											5	5	—	
3068						—					—	—	4 $\frac{1}{2}$	
3468	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	—					—	—	4 $\frac{3}{4}$	
3668						—					—	—	—	
3868	8 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	—					—	—	5	
4068						—					—	—	—	
7'0" frame														
2070														
2470	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	5 $\frac{3}{4}$	2 to 6 $\frac{1}{4}$	2 to 6 $\frac{1}{4}$	2 to 6 $\frac{1}{4}$	—	—	—	
2670	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	6 $\frac{3}{4}$	8 $\frac{3}{4}$				—	—	—	
2870						—					—	—	—	
3070	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	—					—	—	—	
3470						—					—	—	—	
3670	8 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	—					—	—	—	
3870						—					—	—	—	
4070						—					—	—	—	
7'2" frame														
2072														
2472	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	5 $\frac{3}{4}$	2 to 6 $\frac{1}{4}$	2 to 6 $\frac{1}{4}$	2 to 6 $\frac{1}{4}$	—	—	—	
2672	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	5 $\frac{3}{4}$	6 $\frac{3}{4}$	8 $\frac{3}{4}$				—	—	—	
2672						—					—	—	—	
3072	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$	—					—	—	—	
3472						—					—	—	—	
3672	8 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	—					—	—	—	
3872						—					—	—	—	
4072						—					—	—	—	
transom and sidelight frames														
Available in four standard jamb depth Series F416 frame only, for all 1 $\frac{3}{4}$ " door sizes listed above, both single and pairs of doors. Transom panel either metal panel (furnished) or glass style (glazing beads furnished).														

(1) Frames are available for single doors and pairs of doors of leaf sizes indicated. (2) Available in 2'11", 3'0", 3'11", 4'0", 4'11", 5'0" & 5'11" widths. SP/KWH Frames identical to SP/K Frames, but 1" additional jamb opening height eliminates bottom-trimming of wood doors, and hardware is included for pair of sliding doors: hangers with rollers, floor guide, bumper, door pulls and screws. (3) 2" to 6 $\frac{1}{4}$ " wall thicknesses available in $\frac{1}{8}$ " increments.

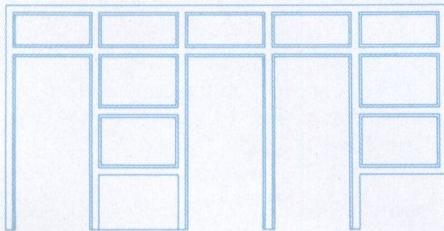


KEWANEE
STEEL DOORS AND FRAMES

8.2/Ke

stick systems

Kewanee dealers are equipped to custom-fabricate special entrances, wall openings, transoms, and sidelights to requirements, utilizing Kewanee's stick system components. They are manufactured from 16-ga. cold-rolled steel in popular jamb depths, and prime-painted. Assistance in design, cost estimates and quotations is available at any project stage.



typical stick system elevation

specifications

notes to architect

1. In general, specify door thickness and skin sheet gauge to fit type of service, frequency of use, label requirements of door and fire-rating of wall. Check UL and local code requirements and hourly ratings for various labels; most require same rating for door label and wall in which located, except 1½-hr. (B) label usually qualifies for use in 2-hr. rated wall, and ¾-hr. (C) label for use in 1-hr. rated wall. For test data on various fire-rated partition systems, see United States Gypsum's Construction Selector SA-100 (Sweet's Architectural File, Sec. 9.5).
2. Check label requirements for fire-rated walls, as the number of pairs of doors in one wall may be limited, and hardware requirements vary according to label, use and local code. See applicable data in this catalog.
3. Frames should be specified to match doors, or type of service and frequency of use, also label requirements.
4. Select and specify proper anchorage from p. 10 for each type of door opening and wall construction.
5. For assistance on specific projects contact your Kewanee dealer or the home office at Kewanee, Ill.

Part 1: general

1.1 scope—Hollow metal doors and steel door frames, as manufactured by Kewanee Manufacturing Division, Kinkead Industries Incorporated.

1.1.1 work included—All material, labor, equipment and transportation necessary to furnish and deliver to the jobsite material as specified in this section.

1.1.2 related work specified elsewhere—Doors and frames in movable partitions; wood and aluminum doors and frames; elevator, vault and revolving doors; toilet compartment doors; structural steel frames; access panels and frames; finish hardware; automatic door openers; glass and glazing; caulking and weatherstripping; field painting.

1.2 qualifications—Hollow metal doors and steel door frames, including appropriate anchorage, shall be fabricated from prime materials in accordance with manufacturer's normal standards and accepted industry practice. Assembly

and installation, including field modifications (and custom fabrication), shall be done by a (hollow metal contractor approved by) (authorized dealer of) Kewanee Mfg. Div. of Kinkead Industries Inc.

1.3 shop drawings—All doors, frames and hollow metal work shall be fabricated as shown on the shop drawings, submitted to and approved by the architect before fabrication.

1.4 delivery and storage of materials—Doors and frames shall be delivered to the contractor at the jobsite. They shall be handled so as to avoid damage and stored upright in a protected area on wood skids, covered with tarpaulins or plastic, vented to avoid condensation and entrapped moisture, until ready for installation. Damaged or deteriorated materials shall be removed from the premises.

Part 2: products

2.1 materials

2.1.1 doors—Hollow metal, full flush seamless steel construction, 1¾" thick, completely filled with small cell phenolic resin-impregnated kraft honeycomb core bonded to (20) (18) (16)-ga. skin sheets with heat and pressure-activated adhesive, 14-ga. channel perimeter reinforcement spot-welded to skin sheets top and bottom, continuously welded to vertical channels with welds ground and finished smooth, invisible on exposed surfaces. Top of exterior swing-out doors filled flush with additional channel to prevent moisture accumulation. Lock edge bevel ⅛" in 2".

Hinge and lock reinforcements integral with vertical perimeter channel, additional reinforcing box for lock specified, internal reinforcing for overhead-surface mounted closers, and for surface-mounted hardware as required, for field drilling and tapping by contractor. Hinge mortise drilled and tapped, 3 full threads minimum for standard weight 4½" x 4½" hinges.

Doors to be cleaned, phosphatized and primed with oven-baked enamel of neutral color, ready for finish painting, and shipped in individual cartons. Cartons to be protected from moisture during shipment and handling.

2.1.2 door accessories

- a. Louvers—manufacturer's standard sight-proof design, 18-ga. steel, minimum 65% free air area, exterior side nonremovable, interior side moulding loose for screw-attachment.
- b. Glazing beads—18-ga. steel, bevel profile with max. $\frac{1}{16}$ " projection from door face, neatly coped and mitered at corners, exterior side nonremovable, interior side screw-attached, provided with all glazed styles.

2.1.3 F-Line frames—Prime, cold-rolled steel, (KD for field assembly with minimum 4 interlocking tabs each jamb to secure head) (assembled, arc-welded, ground and finished smooth), mortised, reinforced, drilled and tapped for standard weight, full mortise template hinges and template strike, mortar guards at all hardware preparations. Provide 1 welded-in floor anchor and 3 lock-in anchors each jamb for field insertion, 24" o.c. max., and furnish with rubber mutes, 3 for single doors, 2 for pairs.

Frames to be cleaned, phosphatized and primed with oven-baked enamel of neutral color, ready for finish painting.

Series (F416) (F418) frames, (16) (18) ga., for 1 $\frac{3}{4}$ " doors, hinge reinforcements 7 ga., strike reinforcement 14 ga., prepared for 1 $\frac{1}{2}$ pr. 4 $\frac{1}{2}$ "x4 $\frac{1}{2}$ " hinges and ASA 115.1, 4 $\frac{1}{8}$ " strike.

Series F818 frames, 18 ga., for 1 $\frac{3}{8}$ " doors, hinge reinforcements 11 ga., strike reinforcement 14 ga., prepared for 3 $\frac{1}{2}$ "x3 $\frac{1}{2}$ " hinges, 1 pr. for 6'8" high, 1 $\frac{1}{2}$ pr. for 7'0" or higher doors, and ASA 115.3, 2 $\frac{3}{4}$ " strike.

2.1.4 PAN-L-FIT frames—Prime, cold-rolled steel, KD construction and formed with additional return leg for installation into completed drywall partitions; mortised, reinforced, drilled and tapped for standard weight, full mortise template hinges and template strike. Provide countersunk screw hole at bottom of each jamb face for anchorage into rough opening, and patented compression lug assembly to close and lock corner miters. Furnish with rubber mutes, 3 for single doors, 2 for pairs.

Frames to be cleaned, phosphatized and primed with oven-baked enamel of neutral color, ready for finish painting.

Series (PF416)(PF418) frames, (16)(18) ga., for 1 $\frac{3}{4}$ "

doors, hinge reinforcements 7 ga., strike reinforcement 14 ga., prepared for 1 $\frac{1}{2}$ pr. 4 $\frac{1}{2}$ "x4 $\frac{1}{2}$ " hinges and ASA 115.1, 4 $\frac{1}{8}$ " strike.

Series PF818 frames, 18 ga., for 1 $\frac{3}{8}$ " doors, hinge reinforcements 11 ga., strike reinforcement 14 ga., prepared for 3 $\frac{1}{2}$ "x3 $\frac{1}{2}$ " hinges, 1 pr. for 6'8" high, 1 $\frac{1}{2}$ pr. for 7'0" or higher doors, and ASA 115.3, 2 $\frac{3}{4}$ " strike.

2.1.5 SP/Kwik-Fit frames—Prime, .027" cold-rolled steel, hot-dipped zinc coated requiring no primer, KD construction and formed with additional return leg for installation into completed drywall partitions; punched and embossed for light duty, full mortise template hinges, and provided with 2 $\frac{1}{4}$ " full-lip strike adaptable to locksets used. Provide countersunk screw hole at bottom of each jamb face, for anchorage into rough opening, and patented compression lug assembly to close and lock corner miters. Furnish rubber mutes, 3 for single doors, 2 for pairs. Provide tapped hinge anchor plates for metal stud construction (for wood stud construction, anchor with hinge screws through jamb into studs).

2.2 labels—Nonremovable labels, of the hourly rating shown on door schedule, shall be permanently affixed to fire-rated doors and frames, showing compliance with (Underwriters Laboratories) (Factory Mutual) () requirements.

Part 3: execution

3.1 doors—Hang doors level and plumb, shimming as necessary at hardware mortises to provide proper clearances and smooth operation with no binding.

3.2 F-Line frames—Set plumb and square, securely anchor to floor construction and brace for erection of surrounding walls. Apply 1 coat of bituminous paint to frame surfaces to be concealed in masonry walls.

3.3 PAN-L-FIT and SP/Kwik-Fit frames—Install according to manufacturer's directions, after partition is completely erected, for snug fit over partition surfacing. (Provide tapped hinge anchor plates with SP/Kwik-Fit Frames in steel stud partitions.)

3.4 labeled frames—Install labeled frames in accordance with NFPA Publications No. 80 and No. 101, and all applicable codes.



Kewanee Metal Doors & Frames

5860 N. Pulaski Rd., Chicago, Ill. 60646
(312) 463-7800

P.O. Box 309 1632 Burlington Ave.
Kewanee, Ill. 61443 (309) 853-4481
Subsidiary of UNITED STATES GYPSUM Company

SA
905

USG sound control ceilings

product folder



UNITED STATES GYPSUM
1976-1
■ 9 P ACOUSTICAL TREATMENT
tile, panels & accessories

9.1/Una

Front Cover: Strong daylighting in hotel lobby contrasts rough-fissured Glacier ACOUSTONE Tile Ceiling with smooth walls and tiled-pattern floors to delight guests with interplay of textures.

REGENCY HYATT HOUSE, Atlanta, Ga.
Architect: EDWARDS & PORTMAN, AIA

With unique new VISTA SONIC Mirrored Ceiling Panels, sound-absorptive ceilings take on new dimensions in spaciousness and dramatic decorative potential. Natural, clear reflection also improves security in stores and shops. See page 14 for details.



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Exposed grid of integrated ceiling system becomes less conspicuous with deep-textured 2x2-ft. Glacier ACOUSTONE Panels.

description and utility

Whatever your ceiling requirements—sound absorption or attenuation, fire protection, accessibility, air distribution—these sound control products, the industry's finest, will fulfill the function.

The tremendous broadening of architectural needs in sound control has been anticipated by United States Gypsum. Through continual research and development, the U.S.G. product line offered today is the most complete ever—ceiling surfaces of classic design and functional beauty in a range of textures and patterns to suit virtually any room and any condition.

The wide scope of types and sizes is presented on the next two pages. Detailed descriptions of individual products follow the tables. Suspension systems are covered on page 26, fire-rated designs on pages 10 and 18 through 20.

U.S.G. Sound Control Products are sold installed, on a contract basis by U.S.G.-recommended Acoustical Contractors. The contractor furnishes all materials and labor necessary to complete the job in accordance with the specifications in this folder.

Critical lighting conditions for acoustical ceilings are often created by modern architectural practice, particularly the use of high light fixtures, windows and cove lights. It is important to visualize the final room lighting when selecting a tile or suspension system. In some instances, beveled materials or exposed suspension produce the most satisfactory results. Complementary components designed as part of an integrated system give assurance of fine appearance and reliable performance. Your U.S.G. representative is happy to assist in your sound control designs.

types and sizes

ACOUSTONE Tile and Panels, prestige sound control materials, are molded mineral fiber units in sizes from 12"x12" to 24"x48" as shown below (as well as practical sizes that can be cut from 24"x48" or 24"x72" molds on special order). ACOUSTONE is provided in nine standard patterns, with specific types for fire, sound and special conditions. The thermal resistance (R) is 2.12 (Installed Resistance of Foil-Backed ACOUSTONE is 4.20 upward and 11.08 downward).

product	pattern	nom. thickness	module size (in.)	edge		installation			weight psf
				SE	BE	adhes.	conc.	exp. grid	
Tile									
ACOUSTONE	"F" Fissured	3/4"	12x12 to 12x48	x	x	x	x		1.30
	Glacier	3/4"	12x12	x		x	x		1.40
			12x24	x			x		1.40
	Finesse	3/4"	12x12		x	x	x		1.40
			12x24		x		x		1.40
	Domino	3/4"	12x12	x		x	x		1.39
Foil-Backed ACOUSTONE	Fissured	3/4"	12x12 to 12x48	x	x		x		1.30
			24x24	x	x		x		1.30
			12x24		x		x		1.30
	Glacier	3/4"	12x12	x			x		1.60
			12x24	x			x		1.60
	Finesse	3/4"	12x12		x		x		1.30
			12x24		x		x		1.30
ACOUSTONE 90	Fissured, Glacier, Finesse	3/4"	12x12	x	x(1)		x		1.30
ACOUSTONE 120	Fissured, Glacier, Finesse	3/4"	12x12	x	x(1)		x		1.30
ACOUSTONE 180	Fissured, Finesse	3/4"	12x12	x	x		x		1.30
AIRSON ACOUSTONE (A-2, A-5, and unslotted)	Fissured	3/4"	12x12 to 24x24	x	x		x		1.30
	120 Fissured	3/4"	12x12	x	x		x		1.30
	Glacier	3/4"	12x12, 12x24	x			x		1.45
	120 Glacier	3/4"	12x12	x			x		1.45
MOTIF'D ACOUSTONE	Georgian, Striated, Galaxy, Fantasia	3/4"	12x12	x			x		1.35
Panels									
Foil-Backed ACOUSTONE (2)	Fissured, Glacier, Finesse, Seacrest	3/4"	24x24	Sq. x	SL x	AE x(6)		x x	1.30-1.40 1.30-1.40
ACOUSTONE 120 (2)	Fissured, Glacier, Finesse, Seacrest	3/4"	24x24	x	x			x	1.30-1.40

ACOUSTONE Space Units are molded mineral fiber sound absorbers for surface-mounting on ceilings and walls where exceptional absorption and special treatment are required. Space Units are provided in two patterns; two installation methods may be used.

product	pattern	nom. thickness	module size (in.)	edge		installation		weight psf
				beveled	clip	clip	3.00 lbs./Unit	
ACOUSTONE Space Units	Glacier, Finesse	2 1/4"	10 1/2 x 10 1/2					

ACOUSTISORBER Space Units provide supplemental reflected-sound absorption for noisy industrial plants. They are low-cost, 20"x24" mineral fiber pads, plastic-encased and metal-framed for suspension overhead, spacing dependent on sound reduction desired.

Abbreviations: adhes.—adhesive; SE—square edge, standard kerf; BE—beveled edge, standard kerf; Sq.—trimmed square edge, no kerf; SL—edge rabbeted for Shadow Line; AE—Accent Edge rabbeted like Shadow Line, additionally beveled approx. 30° to panel plane; BB—butt beveled edge, no kerf; conc.—concealed suspension; exp. grid—exposed grid suspension, direct hung; psf—pounds per square foot; perf.—perforated.

AURATONE Tile and Panels are water-felted mineral fiber acoustical products marketed in eight patterns and sizes of 12"x12" to 30"x60". Thermal resistance (R) is 1.47(½"), 1.85(¾") and 2.18(¾") for regular AURATONE materials and 1.85(¾") and 2.14(¾") for AURATONE FIRECODE products.

product	pattern	nom. thickness	module size (in.)	edge		installation			weight psf
				BB	BE	adhes.	conc.	exp. grid	
Tile									
AURATONE	Pin-Perf.	½"	12x12 12x24	x		x x	x x		.80 .80
		5/8"	12x12 12x24 24x24		x x x		x x x		.90 .90 .90
AURATONE FIRECODE	Pin-Perf., Random Fissured, Filigree, Nordic	5/8"	12x12 24x24		x(4)		x x		1.15 1.15
		¾"	12x12, 12x24		x(4)		x		1.40
AIRSON AURATONE FIRECODE (A-2, A-5, and unslotted)	Fissured	5/8"	24x24		x		x		1.15
		¾"	12x12, 12x24		x(4)		x		1.40
Panels									
AURATONE	Pin-Perf., Fissured, Random, Filigree, Nordic Fissured, Filigree	5/8" ¾"	24x24, 24x36 24x48, 24x60 (3) 24x24, 24x48	x x				x x	1.15 1.37 1.15
AURATONE FIRECODE	Pin-Perf., Fissured, Filigree, Nordic	5/8" ¾"	24x24, 24x48, 30x60(5)	x				x	1.37
AIRSON AURATONE A-2, A-5, and unslotted)	Fissured, Filigree	5/8"	24x24, 24x36, 24x48, 24x60	x				x	1.15
AIRSON AURATONE FIRECODE (A-2, A-5, and unslotted)	Fissured, Filigree	5/8" ¾"	24x24, 24x48, 30x60(5)	x				x	1.37
AURATONE FIRECODE HF	Pin-Perf., Nordic	¾"	24x24, 24x48	x				x	1.40

VISTA SONIC Mirrored Ceiling Panels are constructed from noncombustible, water-felted mineral fiber acoustical board, framed, and covered with .001-in. thick aluminized polyester film stretched to form a mirror. They are produced in one thickness and two sizes for lay-in suspension in standard exposed grid systems. Thermal resistance (R) is 1.85.

product	pattern	nom. thickness	module size (in.)	edge	installation		weight psf
VISTA SONIC Mirrored Panels	optically reflective	15/16"	24x24, 24x48	Sq.		exp. grid	1.45

USG Gypsum Ceiling Panels offer fire-rated construction, without sound absorption, by means of economical lay-in application. They are supplied in ½" thick, in 24"x24" and 24"x48" sizes. Thermal resistance (R) is 0.45.

USG Gypsum Ceiling Panels Interior Exterior	Texture-painted Texture-painted	½" ½"	24x24, 24x48 24x24, 24x48	Sq. Sq.		exp. grid exp. grid	1.88 1.88
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USG Asbestos Board is produced in 24"x24" and 24"x48" sizes for lay-in installation in exposed grid suspensions. While sound absorption of panels alone is negligible, they are effective when perforated and backed by sound-absorbing material.

USG Asbestos Board	Perf., Unperforated	3/16"	24x24, 24x48	Sq.	exp. grid, or nail	1.50-1.75
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NOTES: (1) Glacier pattern not available with beveled edge. (2) Also available in AIRSON A-2, A-5 and unslotted. (3) Other sizes available on special order. (4) Beveled edge, tongue and groove. (5) 30"x60" panels not available 5/8" thick in Fissured and Filigree patterns. (6) Glacier and Seacrest patterns only.



Glacier ACOUSTONE Panels with Shadow Line edge add scale and texture to the bright, modern—and quiet—offices of Hoffmann-La Roche Inc., Nutley, N.J. pharmaceutical firm.

ACOUSTONE "F" Tile lends pleasing contrast in texture to brightly sunlit view through window-wall. ▶

NAZARETH COLLEGE OF ROCHESTER, Rochester, N.Y.
Architect: GIFFELS & ROSSETTI, Detroit, Mich.

ACOUSTONE Mineral Acoustical Tile and Panels... prestige products for creative ceiling designs

ACOUSTONE, with its eloquent patterns and textures, sets the industry standard for beauty and efficient sound attenuation and absorption. Now, more than ever before, its range of sizes, edge treatments and suspension methods offer complete flexibility of concept to the designer.

Designed to absorb sound originating within a room, ACOUSTONE is manufactured by binding mineral fibers into a lightweight, highly decorative product. The molding process insures that no two tile surfaces are monotonously alike. Yet in total, they blend to form ceilings of unique beauty.

ACOUSTONE Mineral Acoustical Tile and Panels are manufactured under rigid tolerances to produce closely controlled dimensions. All types have been tested in accordance with AMA 1-II attenuation and ASTM C423 absorption procedures—data reported on pages 24 and 25.

Fire and Sound Ratings—Noncombustible; Federal Spec. SS-S-118a, Type III, Class 25; Fire Hazard Classifications (ASTM E84 test procedure): flame spread 15, fuel contributed 15, smoke developed 0 to 15; also flame spread 25, fuel contributed 30, smoke developed 0. See page 10 for assemblies with fire ratings

up to 3 hrs., page 25 for tested sound attenuation up to STC Range 55-60.

Thermal Resistance (R)—2.12 (for tile only)

installed resistance (1):	heat flow up	heat flow down
adhesive mounting	2.72	3.02
metal suspension (unbacked)	4.18	4.88
(foil-backed)	4.20	11.08

(1) R-factors shown include "R" for inside air film and air space above installed ceiling unit.

Maintenance—The smooth white-painted finish resists soiling and limits objectionable air travel (breathing) through face of tile. Standard finish is washable vinyl coating, factory applied and heat cured. Also see ACOUSTONE PC, page 10.

Tile and panels may be washed with damp sponge or cleaned with a vacuum cleaner, or chemical rubber sponge (used dry). To paint, roll or spray with a non-bridging paint (TAL Latex Wall Paint or equal).



ACOUSTONE patterns



FISSURED



GLACIER



FINESSE



SEACREST



DOMINO

"F" Fissured . . .

a bold—yet orderly—statement of classic beauty

Tile and panels are molded, screeded and planed to achieve a broad range of textures, from modest veining to bold fissures, resembling the natural beauty of travertine marble. These wide variations of fissure assure that no two tile faces will be exactly alike. When installed in a random application of fissure direction and intensity, ACOUSTONE "F" produces a ceiling that is truly non-directional.

Glacier . . .

rugged texture denoting stability

The heavily fissured, rough surface of Glacier Acoustone Tile and Panels complements contemporary architecture's emphasis on natural texture. The screeded, unplanned finish provides a treatment not generally available in acoustical tile products. Edge joints (and air distribution orifices), while not hidden, are generally obscured by the rich, deeply etched texture.

Finesse . . .

light, subtle fissure for delicate, formal settings

Sophisticated environments suggest the finesse of Finesse Acoustone Tile or Panels. The fissures are the same natural, non-repeating pattern as "F" Fissured, but much smaller and more subtle. The surface is finely planed to tailor the unit; the beveled edges hide minor suspension irregularities.

Seacrest . . .

fluid roughness reminiscent of boiling, running surf

The reticulated, nearly non-directional pattern of Seacrest Acoustone Panels brings unique excitement to dull, uninteresting areas. Square-cut Shadow Line or Accent Edge configurations are available for lay-in application.

Domino . . .

striking frankness in small scale

Routed to simulate nine mini-tile in each 12"x12" unit, Domino Acoustone Tile boldly draws attention to the ceiling with its striking pattern. Ideally suited to rooms of smaller scale, Domino is refreshingly honest about being tile. Fissures are of the same scale and type as those of "F" Fissured.

limitations

Installation of ACOUSTONE Tile or Panels should not begin until residual moisture from plaster, concrete or terrazzo work is dissipated. ACOUSTONE is designed for installation and use under standard occupancy conditions at no more than 80% RH.

ACOUSTONE Tile or Panels should not be used: (a) where continuously exposed to high humidity; (b) below wainscot height or where exposed to impact, abrasion or tampering.

MOTIF'D ACOUSTONE Mineral Acoustical Tile . . . ultimate in distinctive appearance

These impressive patterns are produced by altering ACOUSTONE Tile by a process that permanently etches a bas relief design into the surface. The patterns are accented by the varying shadows caused by directional influence of the lighting, rather than by applied color. Four 12"x12" tiles complete the basic pattern, except in Galaxy. Now offered in four striking patterns, MOTIF'D ACOUSTONE provides NRC ranges up to .75-.85 and Class a light reflectance. All patterns are also available in Foil-Backed ACOUSTONE and Fire-Rated ACOUSTONE.

limitation

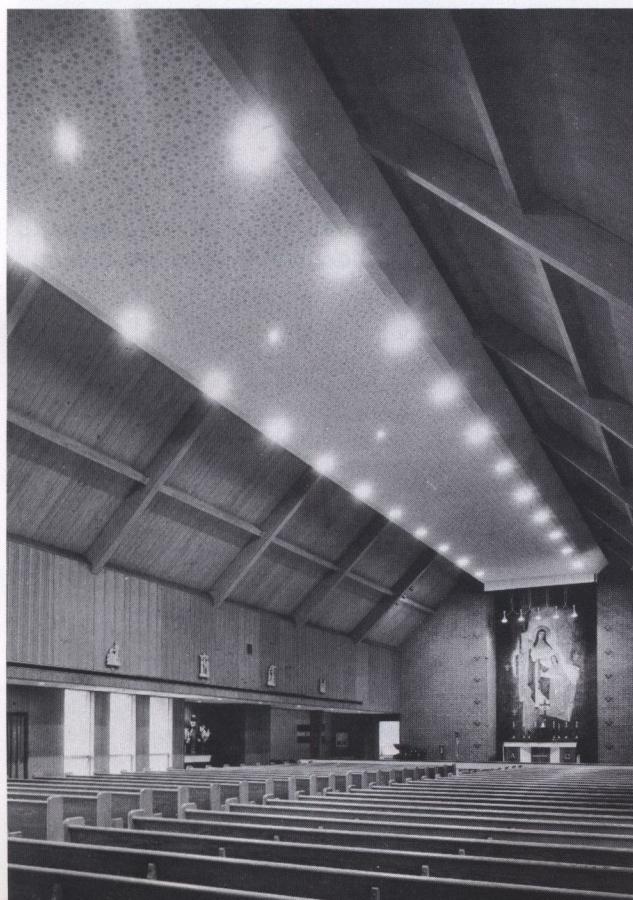
When installing Striated pattern, a checkerboard arrangement of tile (illustrated at right) is recommended to avoid noticeable misalignment of the striations.

Custom MOTIF'D ACOUSTONE Tile . . . designed by you for personalized effect

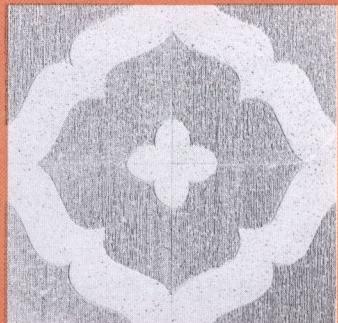
Almost any custom pattern desired—company logograms, function designs, institutional symbols—can be produced with the same methods as in MOTIF'D ACOUSTONE. Designs may be repeated over the entire ceiling or intermixed with standard patterns of ACOUSTONE Tile to achieve the desired results. U.S.G. Sales Engineers can advise the additional cost and complete ordering details for Custom MOTIF'D ACOUSTONE.

Galaxy pattern of MOTIF'D ACOUSTONE dramatizes this plain church interior with rich, contrasting appearance.

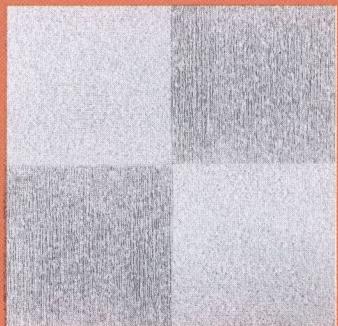
ST. ANN'S CHURCH, Avon, Conn.



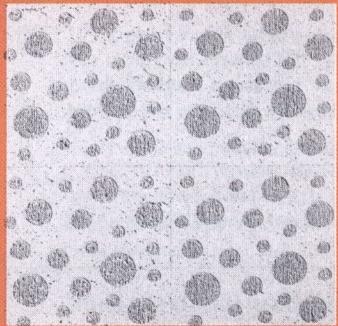
MOTIF'D ACOUSTONE patterns



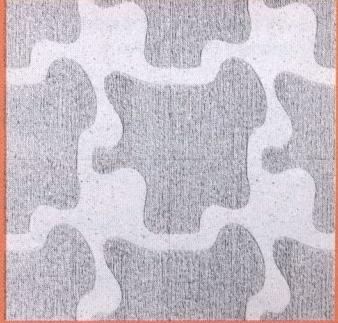
GEORGIAN



STRIATED



GALAXY



FANTASIA

Special-Function ACOUSTONE Tile and Panels... with desired fire, sound, surface features

Fire-Rated ACOUSTONE, in all patterns except Domino, provides 1, 1½, 2 and 3-hr. (Fissured or MOTIF'D only) fire protection while offering the same high sound absorption, light reflection and fissured beauty of regular ACOUSTONE Tile. UL label service is provided for these designs. Refer to page 26 for suspension system information, and to U.S.G. Fire-Rated Systems brochure SC-505 for full data on these systems.

Foil-Backed ACOUSTONE gives the same appearance and excellent acoustical performance as regular ACOUSTONE Patterns. In addition, a special reflective aluminum foil on the back surface provides improved resistance to breathing and substantially greater insulating effect against heat loss/gain. This translates into operating cost savings for summer cooling (over 40%) and winter heating (over 10%) which—at today's escalating fuel prices

—quickly return the small cost premium, then continue to reduce energy costs. The product's effectiveness is shown by the "R" factors on page 6, and through detailed comparisons in separate U.S.G. brochure SC-832. **Fissured, Glacier, Finesse** and **Seacrest** textures are available.

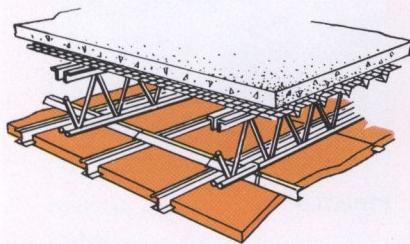
ACOUSTONE PC is supplied with a factory-applied plastic surface coating, ideal for reducing maintenance in ceilings where high soiling is anticipated. The durable soft-luster surface has at least 10 times the washability of regular acoustical finishes; otherwise, tile characteristics remain unchanged. All ACOUSTONE products listed above are available with this plastic coating.

Standard Color of all ACOUSTONE products is painted white. Pastel colors of TAL Latex Paint are available on special order.

UL Designs for ACOUSTONE products

bar joist/concrete deck on riblath

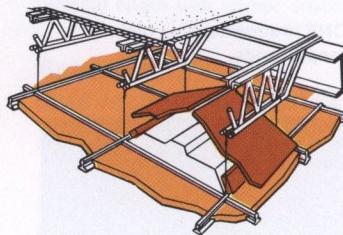
3-Hr. UL Design G017 (was 96-3 Hr.)
ACOUSTONE 180 Mineral Tile, 12" x 12", suspended on concealed Z-splines hung from bar joists with concrete deck above.



2-Hr. UL Design G018 (was 41-2 Hr.)
ACOUSTONE 120 Mineral Tile, 12" x 12", suspended on concealed Z-splines hung from bar joists with concrete deck above.

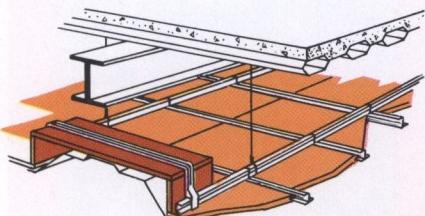
1½-Hr. UL Design G020 (was 6-1½ Hr.)
ACOUSTONE 90 Mineral Tile, 12" x 12", suspended on concealed Z-splines hung from bar joists with concrete deck above.

2-Hr. UL Design G228 (Beam 2 Hr.)
(was 278-2 Hr.)
ACOUSTONE 120 Mineral Tile, 24" x 24", laid on direct-hung Shadow Line grid suspension with concrete deck above.†



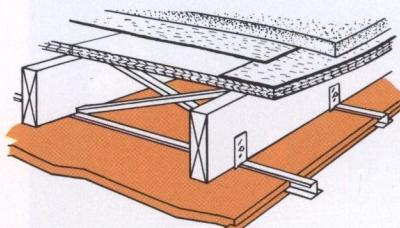
steel frame, floor/concrete deck

2-Hr. UL Design A010 (was 85-2 Hr.)
ACOUSTONE 120 Mineral Tile, 12" x 12", suspended on indirect-hung concealed Z-splines with concrete deck above.†



wood joists & subfloor

1-Hr. UL Design L003 (was 15-1 Hr.)
ACOUSTONE 90 Tile, 12" x 12", on concealed Z-splines attached to wood joists with wood floor or MASTICAL Underlayment Compound.



†AIRSON ACOUSTONE 120 Tile may be substituted.



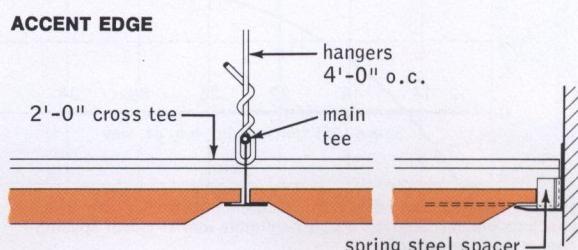
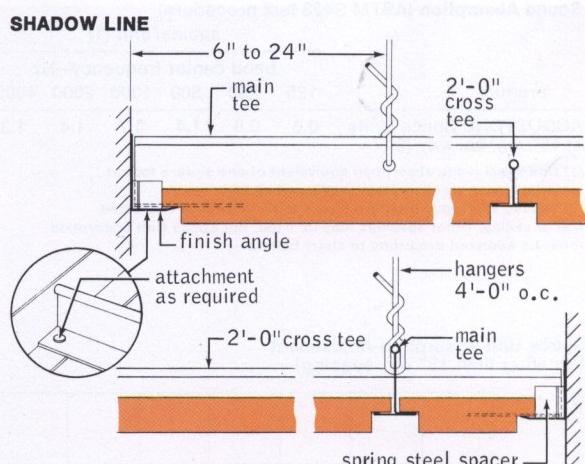
Pattern and texture of 24"x48" Seacrest ACOUSTONE Panels with Shadow Line edge are immediately apparent in this office, but their primary function is keeping things quiet.

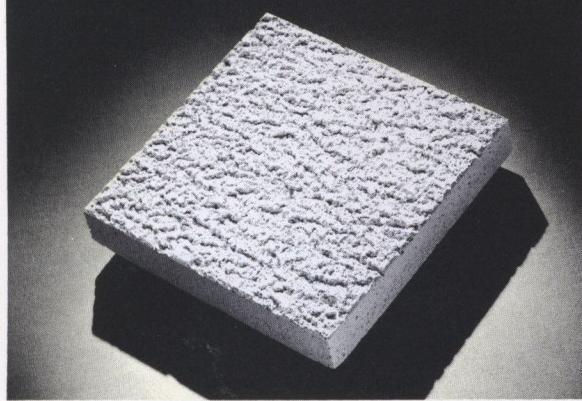
Shadow Line ACOUSTONE Panels . . . functional design that speaks for itself

Deep-rabbeted edges of these 24"x24" or 24"x48" panels combine with direct-hung exposed grid suspension system (see drawing, right) to produce one of the most impressive acoustical ceiling treatments available today. The massive-sized panels give any room a bold new scale, accenting the masculine, proclaiming the integrity of design and construction. Available in **Fissured**, **Glacier**, **Finesse** and **Seacrest** patterns of ACOUSTONE Mineral Acoustical Panels.

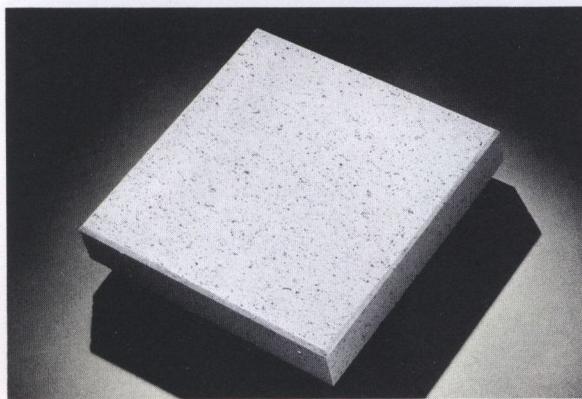
Accent Edge ACOUSTONE Panels . . . dramatic detail that expands ceiling mass

With Accent Edge, the crisp-lined contemporary look of Shadow Line takes on the traditional feeling of mass. This shallow-chamfered edge blends suspension grid with ceiling panels for a "paneled look"; the increased visible surface area subtly accentuates the rugged mass of rough-textured **Glacier** and **Seacrest** patterns, both available in 24"x24" panels. Accent Edge helps compensate for slight misalignments, affords quick lay-in installation. New—and exclusive with U.S.G.





GLACIER . . . Bold rich texturing created by deep, heavy fissures on the natural, unplanned surface



FINESSE . . . Classically beautiful and subdued . . . created by subtle fissures within the finely textured natural surface

ACOUSTONE Space Unit patterns

ACOUSTONE Space Units . . . simplified modern method of adding absorption

Uncontrolled reverberations transform sound into noise, muffling music and disrupting effective communication. ACOUSTONE Space Units control reverberation for optimum acoustics in a wide variety of room functions. These efficient Space Units *absorb sound on all six surfaces* to reduce reverberation, the amount depending upon number and spacing of Units and sound source frequency. They also are effective in eliminating flutter echo, reducing noise levels and treating "spot" problem areas in both new construction and remodeling.

ACOUSTONE Space Units are free-standing, sound-absorbing design plaques composed of mineral fibers and binder, molded to form noncombustible, lightweight units. They can be used in many possible arrangements on either walls or ceilings as primary acoustical treatment, or as an economical supplement to other acoustical control.

Produced in two patterns—**Finesse**, with a finely textured smooth surface, and **Glacier**, featuring a heavily fissured rough surface—10½" sq. x 2¼" thick, designed for surface-mounting with two types of metal clips. Standard color is white. Standard finish is washable vinyl coating, factory-applied and heat-cured.

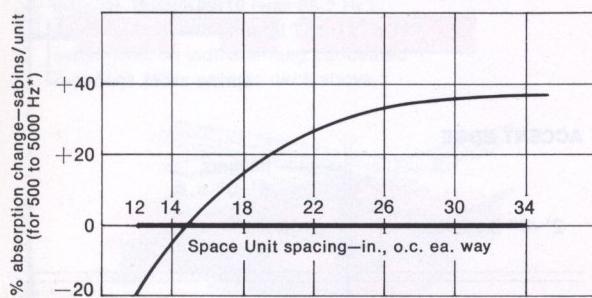
ACOUSTONE Space Units easily solve stubborn reverberation problems, photos illustrate only two of numerous applications.

product	band center frequency—Hz					
	125	250	500	1000	2000	4000
ACOUSTONE Space Units at 15" o.c. ea. way (2)	0.3	0.8	1.4	1.7	1.4	1.3

(1) One sabin is the absorption equivalent of one square foot of material having an absorption coefficient of 1.00.

(2) Spaced in a regular pattern over a fairly large area of treated wall or ceiling. Other spacings may be used, but Space Unit absorption must be adjusted according to chart below.

Space Unit Absorption-Adjustment (for other than 15" o.c. spacing)



*125 and 250 Hz bands not shown, since their absorption change at spacings greater than 15" o.c. is negligible and at closer spacing cannot be extrapolated.



limitations

ACOUSTONE Space Units are not recommended where subjected to impact, water immersion, splashing or condensation. They may be used under certain conditions of adverse temperature and humidity (contact your U.S.G. sales representative for acceptability). Ceiling or overhead installation is not recommended where condensation is likely, such as in swimming pools and ice rinks.

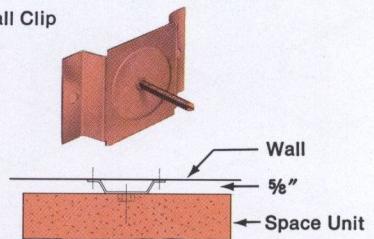
installation

Spin-on Clip—This standard wall clip is suitable for Space Units centered not closer than 14", or 7" from any obstruction, to allow free rotation of the unit during installation. The wall clip with a stud attached is secured with two suitable fasteners. Each Space Unit has a nut embedded in the back and is turned clockwise on the stud until secure.

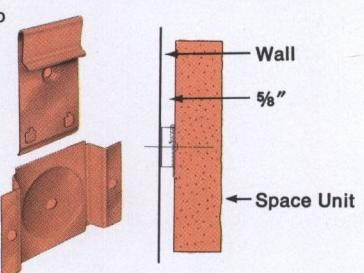
Snap-on Clip—This clip is used if Space Units are centered closer than 14", or less than 7" from obstructions; also used with concrete waffle slabs, intersecting walls or ceilings, columns and pilasters, or other close-quarter installations.

The wall clip is secured with two suitable fasteners and the supplementary Snap-on Clip is screw attached to the Space Unit. The two clips are pressed together, first engaging Snap-on-Clip's upper lip and then the lower.

Spin-on Wall Clip



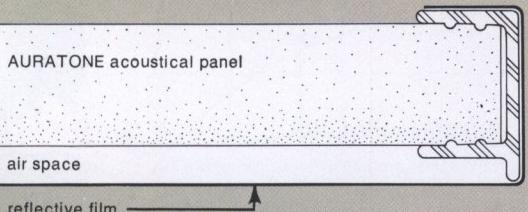
Snap-on Clip





Reflective ceiling of VISTA SONIC Panels increases sales receptiveness in an atmosphere of spaciousness.

VISTA SONIC Panel cross-section



VISTA SONIC Mirrored Ceiling Panels . . . clearly reflective, exclusively sound-absorbing

VISTA SONIC Mirrored Ceiling Panels are a new concept in reflective ceilings, designed as lightweight acoustical units suspended by standard exposed grid systems. They provide a unique combination of sound absorbency with distortion-free light reflection equal to costly front-surface glass mirrors, yet are safe and shatterproof. VISTA SONIC Panels heighten visual space perception to create dramatic decorative effects, multiply impact of product displays and exhibitions, improve security in shops and stores.

These optically reflective panels are constructed from noncombustible mineral acoustical board rigidly framed and covered with a tough resilient surface film stretched to form a $15/16$ " thick mirrored assembly. The polyester film, .001" thick, has an aluminized back surface that provides light reflection of optical clarity. The mirror is non-static which minimizes dust build-up and makes cleaning easier. A $1/8$ " air space behind the film, created by the special frame, allows the film to flex under minor impact without damage. The $5/8$ " thick backing is composed of mineral-wool fibers and certain refractory materials water-felted to form non-combustible acoustical units. The panel assembly is available in 24"x24" and 24"x48" sizes, square-edged for lay-in application.

Fire Resistance—Noncombustible; Federal Spec. SS-S-118a, Type IV, Class 25(1); Fire Hazard Classification (ASTM E84 test procedure): flame spread 10, fuel contributed 10, smoke developed 0.

Thermal Resistance (R)—1.85

installed resistance (1):	heat flow up	heat flow down
$5/8$ " metal suspension	3.90	4.60

(1) R-factors shown include "R" for inside air film and air space above installed ceiling unit.

Sound Ratings—VISTA SONIC Panels, with an NRC range of .35-.45, are the only sound-absorbent mirrored panels on the market (see table, page 24).

Economy, Accessibility—VISTA SONIC Panels offer advantages over other types of reflective ceilings in two ways: (1) lower cost, (2) easy access to service lines above the ceiling, through lay-in installation.

Light Reflectance—Class a.

Maintenance—Cleaning is as simple as applying a liquid household cleaner with a soft, lint-free cloth. Light scratching can be restored by spraying with a foam cleaner and polishing lightly with a soft cloth.

limitations

Installation should not be made: (a) where panels will be continuously exposed to high humidity (more than 80% RH); (b) below wainscot height or where exposed to impact, abrasion or tampering.

Film integrity must be preserved; panels must not be cut to partial size or to allow for sprinkler heads or lighting fixtures. Film should be protected from damage by sharp edges, abrasion or undue pressure.



USG Gypsum Ceiling Panels . . . low-cost ceilings with 2-hr. fire rating

USG Gypsum Ceiling Panels are composed of noncombustible gypsum core with baked-on textured paint finish. They are produced in two formulations—exterior and interior—to provide attractive ceilings and soffits at economical cost while exhibiting superior fire resistance, high light reflectance and ease of maintenance. The textured panels (check with U.S.G. representative for pattern availability) are supplied $\frac{1}{2}$ " thick, in 24"x24" and 24"x48" sizes for suspension in exposed grid systems. Edges are square-cut for lay-in application. Light reflectance is Class a (ASTM C523 test procedure).

Fire Resistance—USG Gypsum Ceiling Panels are noncombustible. Fire Hazard Classification (ASTM E84 test procedure): flame spread 25, fuel contributed 5, smoke developed 0. FIRECODE 24"x24" Panels qualify for 2-Hr. UL Design G222 (Beam 2 Hr.)

Sound Rating—When tested in exposed grid suspension system, continuous over partitions, USG Gypsum Ceiling Panels produced sound attenuation in the STC 40-44 range.

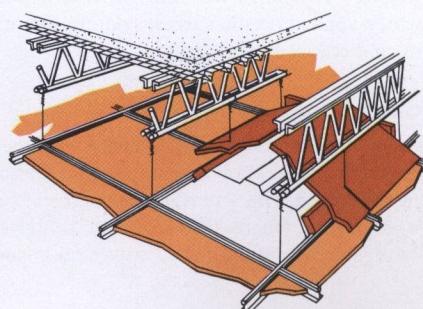
Economy, Accessibility—Panels provide total accessibility to service areas above at minimum cost for fire-rated construction.

Limitation—Not recommended where (a) sound absorption is required; (b) exposure to moisture is extreme or continuous; (c) directly exposed to weather or water. Exterior suspension system must be approved for exterior use by manufacturer.

USG Gypsum Ceiling Panels provide ideal exterior ceiling for drive-in bank canopy.

The NATIONAL BANK OF SOUTH CAROLINA, Columbia, S.C.
Architect: LA FAYE-LA FAYE & Assoc.

2-Hr. UL Design G222 (Beam 2 Hr.)
(was 312-2 Hr.)
USG FIRECODE Gypsum Ceiling Panels,
 $\frac{1}{2}$ "x24"x24" laid on direct-hung exposed
grid suspended from bar joists with $2\frac{1}{2}$ "
concrete deck above.



AURATONE

Noncombustible Panels and Tile . . . economical beauty in virtually every module

AURATONE Acoustical Panels and Tile are the result of a carefully controlled formulation that yields optimum balance between sound attenuation and sound absorption. They are made from prepared mineral fiber in a plant specially designed for this product. They include a high-density $\frac{3}{4}$ " ceiling panel, with improved stability, absorption, attenuation and insulation values.

The AURATONE line includes both Regular and FIRECODE Panels and Tile (see table, page 5), in the patterns illustrated here; the tile in $\frac{1}{2}$ ", $\frac{5}{8}$ " and $\frac{3}{4}$ " thicknesses, 12"x12", 12"x24" and 24"x24" sizes; the lay-in panels in $\frac{5}{8}$ " and $\frac{3}{4}$ " thicknesses, 24"x24" to 30"x60" sizes. The 24"x24" panel is available with the exclusive **Shadow Line** edge for recessed grid appearance. All patterns come with a washable, smooth white finish.

Also available are AURATONE FIRECODE HF Panels, designed for applications where high temperatures and humidity are likely to be encountered. They are provided in $\frac{3}{4}$ " thickness, all standard panel sizes, and in Pin-Perforated and Nordic patterns.

Fire Resistance—Noncombustible; Federal Spec. SS-S-118a, Type III, Class 25; Fire Hazard Classification (ASTM E84 test procedure): flame spread 25, fuel contributed 25, smoke developed 5.

Fire ratings of 1 through 4 hours have been obtained for systems illustrated on pages 18 through 20.

Thermal Resistance (R)—Panels: 1.85 ($\frac{5}{8}$ "); 2.18 ($\frac{3}{4}$ ")

Tile: 1.85 ($\frac{5}{8}$ "); 2.14 ($\frac{3}{4}$ ")

installed resistance (1):	heat flow up	heat flow down
$\frac{5}{8}$ " regular panels	3.90	4.60
$\frac{5}{8}$ " FIRECODE panels	3.05	4.60
$\frac{3}{4}$ " regular panels	4.18	4.88
$\frac{5}{8}$ " FIRECODE tile	3.50	4.20
$\frac{3}{4}$ " FIRECODE tile	3.80	4.50

(1) R-factors shown include "R" for inside air film and air space above installed ceiling unit.

Sound Ratings—The various AURATONE patterns range from .45 to .80 in NRC Average, and carry STC Ratings of 35 to 49 (see tables, pages 24 and 25). The ability to stop sound from passing through the ceiling material and back again into other occupied areas is one of the outstanding characteristics of AURATONE Panels. Major factors contributing to the high sound attenuation figures of AURATONE are the density and thickness of the panels.

Economy, Accessibility—AURATONE Panels are the wise choice for any application calling for maximum performance at minimum cost—plus easy access to service lines above the ceiling, through lay-in installation in exposed grids. AURATONE Tile edge designs accommodate spline suspension, recessed grid, stapling or adhesive attachment.

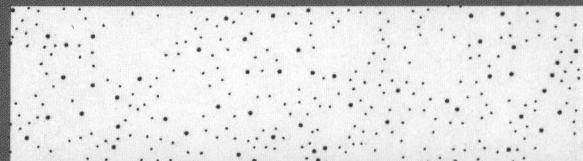
Light Reflectance—Class a.

Plastic Coating—All panel and tile patterns are available with the PC factory-applied plastic surface coating for vastly improved washability and reduced maintenance.

Limitations

Although AURATONE FIRECODE HF Panels are exceptionally durable under severe temperature and humidity conditions, they must be handled and stored with a reasonable degree of protection, and used in applications where they are not saturated or heavily splashed with water, or subjected to continual condensation.

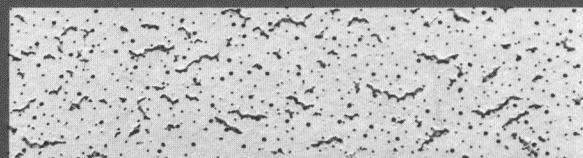
AURATONE patterns



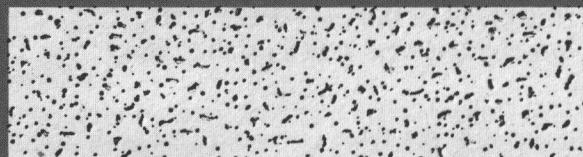
Pin-Perforated—Bone white, unobtrusive random pattern with medium and small holes (1530 per sq. ft.) adds illusion of height.



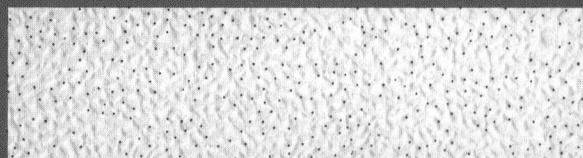
Random—Non-directional freeform perforation patterns with large and medium diameter holes, 445 per sq. ft.



Fissured—Random fissuring deeply etched below the planed surface, brings rugged beauty to any room.



Filigree—A non-directional pattern so fitting for large installations in more formal settings.



Nordic—Acoustical efficiency by means of minute perforations, combined with eye-pleasing new rifled texture.

Shadow Line suspension adds design interest to this office even as 24"x24" AURATONE Filigree Panels diminish the sound level. ▶

SHELBY OAKS PLAZA BUILDING, Memphis, Tenn.
Architect: McFARLAND & Assoc., AIA

**SA
905**

USG sound control ceilings



UL Designs for AURATONE products

Special-Function AURATONE Panels and Tile . . .

AURATONE FIRECODE Panels and Tile are specially formulated to provide 1- to 4-hour fire protection when used in suspension systems tested by Underwriters Laboratories Inc.: yet, they offer the same sound absorption, light reflectance and beauty as regular AURATONE Panels and Tile.

The following UL Designs offer a selection of exposed grid for lay-in applications, concealed Z-spline indirect-hung suspension and concealed accessible direct- or indirect-hung suspension. The concealed accessible suspension provides easy access to the plenum area above the ceiling for servicing electrical, heating and air conditioning installations. The Designs cover a wide range of floor and roof constructions to meet virtually every building requirement. Refer to page 26 for suspension system information, and to U.S.G. Fire-Rated Systems brochure SC-505 for complete descriptions of these systems.

AURATONE PC Panels and Tile are provided with a special factory-applied plastic coating which reduces ceiling maintenance where high soiling is anticipated.

Non-Standard Sizes of AURATONE are available within the following limits on special order:

width	length
12" to 30"	24" to 60"

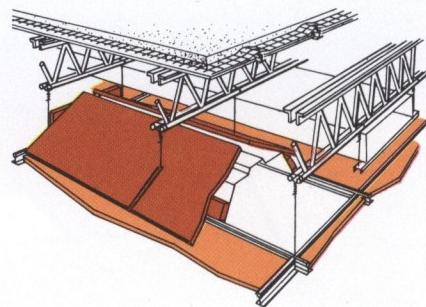
Consult local building officials for acceptance; UL label service not available for most non-standard sizes. Limits by product type may be obtained from U.S.G.

bar joist/poured gypsum deck

2-Hr. UL Design P207

(was RC-6-2 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48", laid on direct-hung exposed grid suspended from bar joists with 2" gypsum roof deck poured on gypsum or mineral fiber formboard.[†]



PANELS

bar joist/concrete deck on riblath

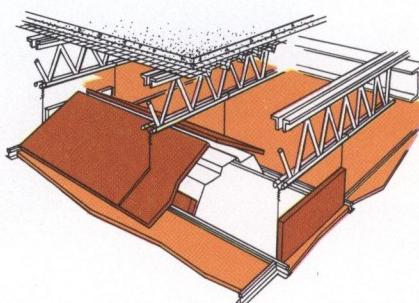
2-Hr. UL Design G231 (Beam 3 Hr.)

(was 299-2 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ " or $\frac{3}{4}$ ", modules from 24"x24" to 30"x60", or 20"x60", laid on direct-hung exposed grid suspended from bar joists with 2½" concrete deck on metal lath above.[†]

2-Hr. UL Designs G211 (was 72-2 Hr.) and G227 (Beam 4 Hr.) (was 226-2 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from bar joists with 2½" concrete deck above. Shadow Line Panels approved for Design G227.[†]



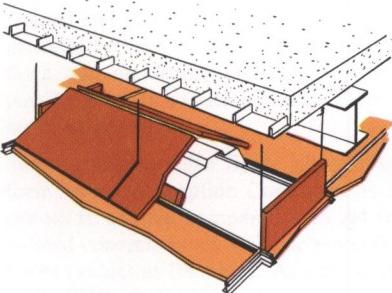
2-Hr. UL Design G251

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48", laid on direct-hung grid suspended from bar joists, with 2½" concrete deck above poured over metal lath.

[†]AIRSON AURATONE FIRECODE Panels may be substituted.

steel frame, floor/concrete deck**4-Hr. UL Design D206 (Beam 4 Hr.)**

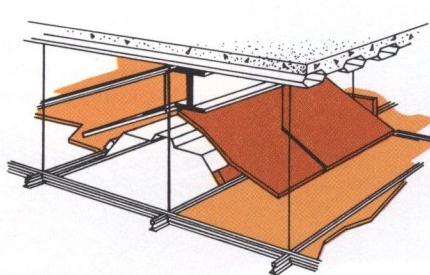
(was 45-4 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48", laid on direct-hung exposed grid suspended from steel floor and 2 $\frac{1}{2}$ " concrete deck above.**3-Hr. UL Design D207 (Beam 3 Hr.)**

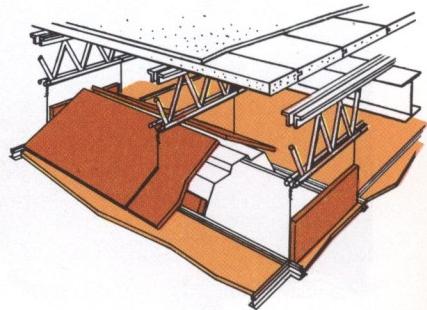
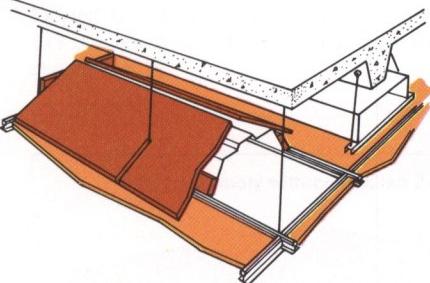
(was 226-3 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from steel floor and 2 $\frac{1}{4}$ " concrete deck above.**3-Hr. UL Design A207 (Beam 4 Hr.)**

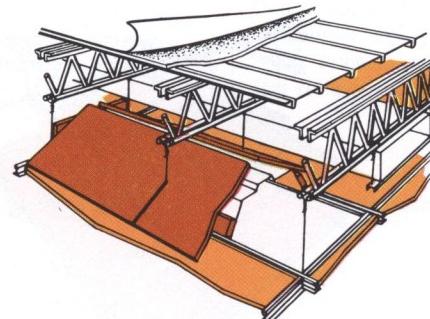
(was 65-3 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48", laid on direct-hung exposed grid suspended from cellular steel floor and 2 $\frac{1}{2}$ " concrete deck above.†**bar joist/gypsum plank deck****2-Hr. UL Design G230 (Beam 2 Hr.)**

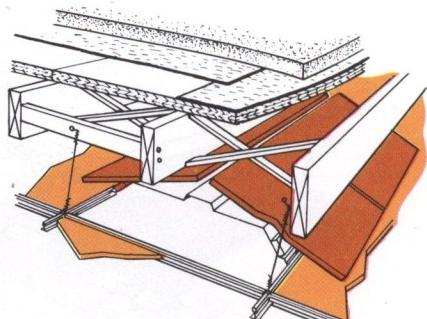
(was 293-2 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from bar joists with USG Gypsum Floor Plank and 3 $\frac{1}{4}$ " MASTICAL Underlayment Compound above.**prestressed concrete T-beam/deck****2-Hr. UL Design J202**AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from prestressed concrete T-beam/deck.**bar joist/steel roof deck****1-Hr. UL Design P214**

(was RC-15-1 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48", laid on direct-hung exposed grid suspended from bar joists with 1 $\frac{1}{2}$ " steel roof deck and 1" noncombustible insulation above.**wood joists & subfloor****1-Hr. UL Design L206**

(was 31-1 Hr.)

AURATONE FIRECODE Panels, $\frac{5}{8}$ "x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from 2x10 wood joists with 1" nom. wood floor or MASTICAL Floor Underlayment Compound above.

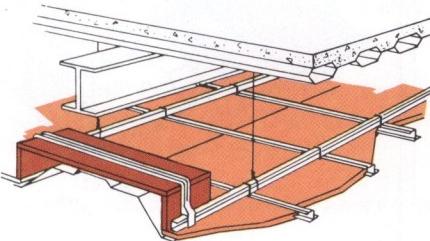
Special-Function AURATONE Panels and Tile *continued*

TILE

steel frame, floor/concrete deck

3-Hr. UL Design A009 (Beam 4 Hr.)
(was 59-3 Hr.)

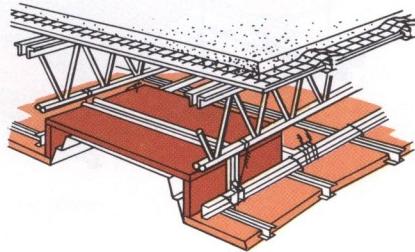
AURATONE FIRECODE Tile, $\frac{3}{4}$ "x12"x12", suspended on concealed Z-spline system with cellular steel floor and 2 $\frac{1}{2}$ " concrete deck above.†



bar joist/poured gypsum deck

2-Hr. UL Design P002
(was RC-13-2 Hr.)

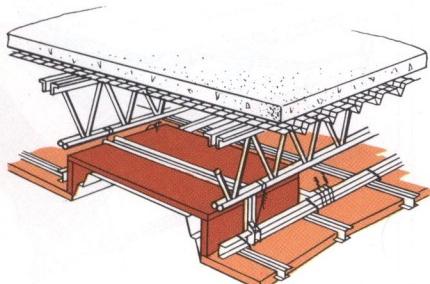
AURATONE FIRECODE Tile, $\frac{5}{8}$ "x12"x12", suspended on concealed Z-spline system hung from bar joists with 2 $\frac{1}{2}$ " gypsum roof deck poured on gypsum or mineral fiber formboard.†



bar joist/concrete deck on riblath

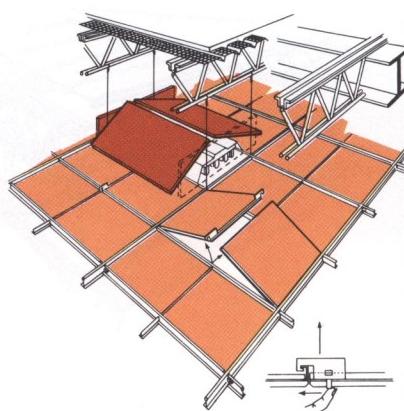
2-Hr. UL Design G019
(was 84-2 Hr.)

AURATONE FIRECODE Tile, $\frac{5}{8}$ "x12"x12", suspended on concealed Z-spline system hung from bar joists with 2 $\frac{1}{2}$ " concrete deck on riblath above.†



2-Hr. UL Design G008 (Beam 2 Hr.)
(was 281-2 Hr.)

AURATONE FIRECODE Tile, $\frac{5}{8}$ "x12"x12" or 24"x24", suspended on concealed accessible grid system with 2 $\frac{1}{2}$ " concrete deck on riblath over bar joists above.†



†AIRSON AURATONE FIRECODE Tile may be substituted.

ACOUSTISORBER Space Units . . . simple, low-cost, suspended sound absorbers that arrest plant noise build-up

High industrial noise levels are a problem largely due to the build-up of reverberant sound energy resulting from a lack of adequate sound-absorptive surfaces. Newly developed to meet this widespread need are ACOUSTISORBER Space Units. Metal-framed and plastic film-encased, these mineral fiber pads are suspended overhead to effectively control such noise. Each unit, 1-in. thick and measuring 20"x24", is simply installed on prehung parallel wires in a spacing pattern determined from the calculated noise reduction.

Since ACOUSTISORBER Space Units absorb sound on *both sides*, their Sound Absorption Coefficient is an exceptional 1.5 sabins per sq. ft. of unit, compared with .04 for steel roof deck, .07 for painted concrete block walls or wood floors, and .02 for concrete floors (values at 1000 Hz). As a bonus, the high reflectivity of the white PVC plastic film helps to boost brightness levels in dimly-lit areas. The spacing pattern should be as balanced as possible, but is not critical and an irregular pattern does not compromise the units' efficiency. Overhead fixtures and utilities need not be moved, for ACOUSTISORBER Units can be hung around them.

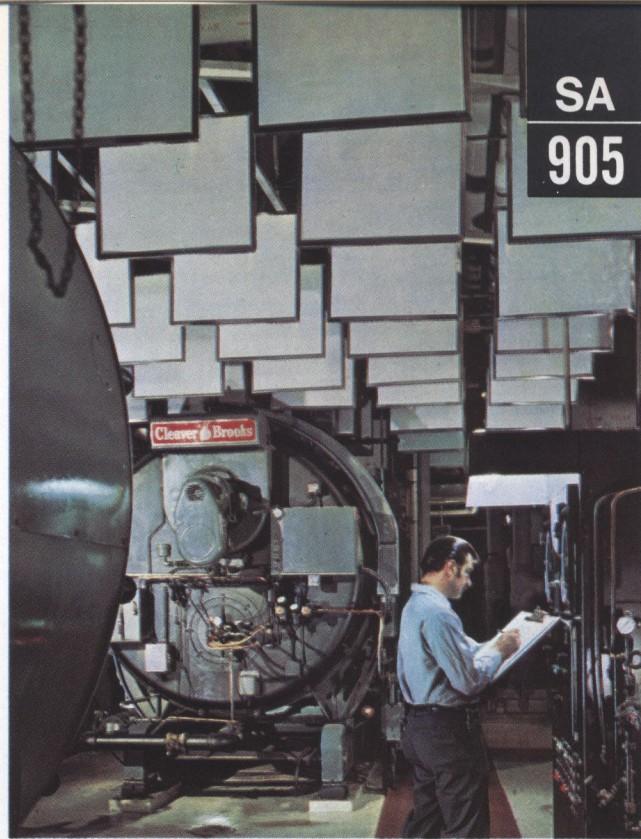
Fire Resistance—ACOUSTISORBER Space Units are noncombustible. Fire hazard classification (ASTM E84 test procedure): flame spread 0, fuel contributed 15, smoke developed 5.

Sound Rating—As tested by Riverbank Acoustical Laboratories (test no. A-72-90) ACOUSTISORBER Space Units 1 ft. apart in rows 3 ft. o.c. showed sound absorption characteristics as follows:

frequency (Hz)	125	250	500	1000	2000	4000
absorption (sabins per 20"x24" unit)	0.7	1.7	3.3	5.0	5.3	3.9

For complete data on absorption and procedures for calculating the number of units required, see U.S.G. Folder SC-811.

Limitations—ACOUSTISORBER Units (1) reduce only reverberant sound energy; sound direct from source to listener is unaffected; (2) are effective as sole treatment only for sound level reductions of approximately 7 db or less, thus are recommended for reductions greater than 7 db only in combination with other forms of acoustical treatment, most effectively at the source; (3) must be located to not interfere with fire-protection sprinkler operation; (4) are not recommended for use in areas where temperatures exceed 150°F.



Easily installed ACOUSTISORBER Space Units help keep irritating, damaging noise levels down, personnel comfort and morale up.

Non-Acoustical Ceiling Materials . . . for specialized applications

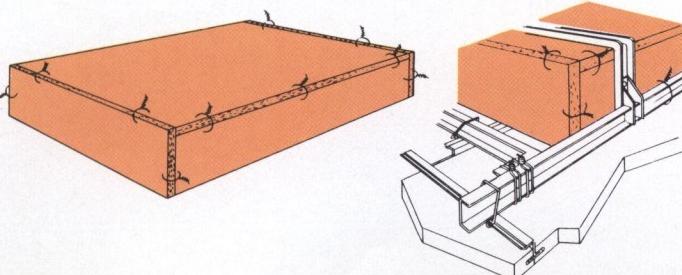
USG Asbestos Board, $\frac{3}{16}$ " thick in nom. 24"x24" and 24"x48" sizes, is supplied either Perforated or Unperforated, for lay-in use in ceiling grid systems. Square-edged or beveled ($\frac{1}{16}$ " bevel on all four sides). Perforations, .197" dia., are spaced $\frac{1}{2}$ " o.c. White Rippleton texture finish. For other data, see table on page 5.

Other tile bases, where a noncombustible base for adhesive application of ceiling tile is required, include SHEETROCK and SHEETROCK FIRECODE Gypsum Panels, and ROCKLATH Plaster Base. See U.S.G. Folders SA-917, SA-927.

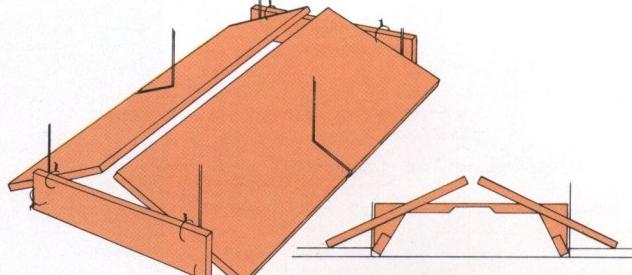
THERMAFIBER Light Fixture Protection brings packaged convenience to jobs using U.S.G. ceiling systems, whether panel or tile. This consists of $1\frac{1}{4}$ " thick semi-rigid mineral wool board wire-tied and suspended over fixtures. The assemblies (illustrated below) carry UL Labels covering board module ceiling designs of 1, $1\frac{1}{2}$, 2, 3 and 4 hours for which ratings have been established. They are adaptable to acoustical tile and panel ceiling constructions using either an exposed grid or concealed Z-spline suspension.

The THERMAFIBER package is shipped in one module for acoustical ceiling panels, and in three where tile is used.

box assembly with concealed Z-spline suspension



tent assembly with exposed grid



AIRSON Air Distribution Systems . . . optimum answer to constant comfort

ACOUSTONE Tile and AURATONE Panels and Tile are supplied in four types and four popular patterns for use in the AIRSON Ceiling Air Distribution System. This system, with millions of square feet in use, employs openings in the tile or grid to distribute a wall-to-wall flow of heated or cooled air into a room. Unlike traditional methods of air distribution, the AIRSON Tile or Panel System is not dependent upon a costly and complicated system of air supply ducts and diffusers. Instead, it utilizes the plenum area above the ceiling to carry conditioned air to the room through individual tile or grid orifices. The continuous, uninterrupted beauty of the ceiling is preserved, as all visible diffusers are eliminated.

In the standard AIRSON Tile System, movable slides on the backs of the tiles (easily adjustable from below) act like small dampers to control the volume of air. Since each tile or panel is individually adjustable, the area can be zoned and balanced for comfort. The ceiling surface is installed on concealed Z-splines or exposed grid—either with all of the tile in the ceiling slotted to provide AIRSON jets, or with a percentage of tile unslotted.

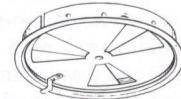
The ACOUSTONE and AURATONE products used are specially designed for use with AIRSON. The bright, non-breathing, foil-back surface prevents seepage of air through the field of the tile and provides reflective insulation in the plenum space. The selection consists of $\frac{3}{4}$ " ACOUSTONE, either the regular or rated 120 version, in Fissured and Glacier patterns, 12"x12", 12"x24" and 24"x24" sizes; $\frac{5}{8}$ " AURATONE Panels, regular or FIRECODE, 24"x24" to 30"x60" sizes, and $\frac{5}{8}$ " or $\frac{3}{4}$ " AURATONE FIRECODE Tile, 12"x12" to 24"x24" size—in Fissured pattern. All are available plastic-coated if desired.

Two jet arrangements are offered: A-2, with two orifices per tile, and A-5, with five orifices placed parallel with the fissures of the tile. The A-2 orifice arrangement gives a 35% deeper penetration than A-5 at the same flow conditions, making it more suitable for high ceiling-low flow applications. Both have been proven by test far superior in penetration to ordinary perforated ventilating tile. For added flexibility, AIRSON AURATONE Panels may be furnished with either 25%, 50% or 100% slotting. A third type of tile available is unslotted.

In addition to the slotted tile suspension, AIRSON Grid systems are used with unslotted panels and tile. These are the steel AIRFLO T-2 Grid and T-4 Grid in which air distribution is accomplished through orifices at 2" intervals in the face of the tee. Both systems include complete metal accessories: slides, splines, mouldings, runners, spot jets, clips. Design, erection and specification are covered in U.S.G. AIRSON Air Distribution Systems brochure SC-504.

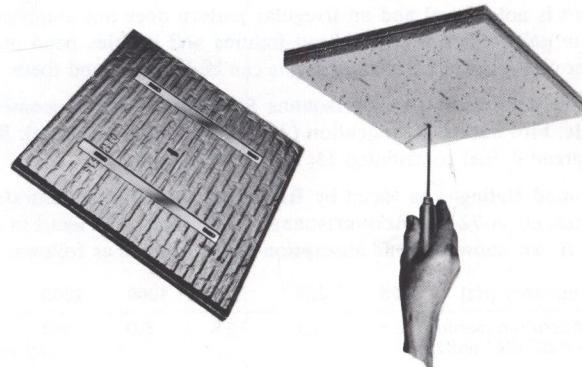


AIRSON ACOUSTONE A-2 Tile

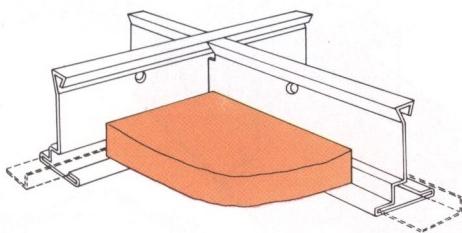
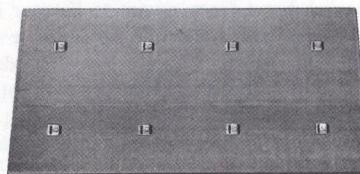


Spot Jet

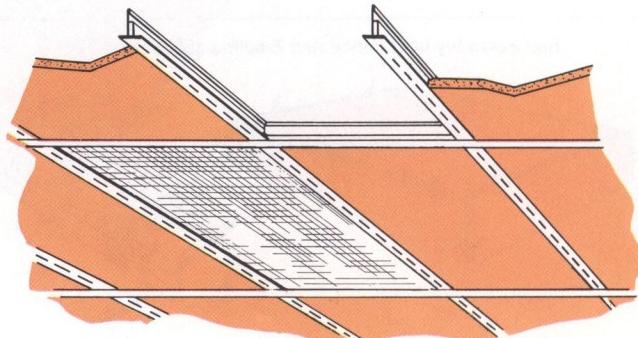
Top and bottom views of AIRSON ACOUSTONE A-5 tile (below) show foil and adjustable slides located on back of unit, and adjustment from face of unit made easily with ordinary ice pick for air flow control.



In the AIRSON AURATONE A-2 panel (below), adjustable damper slides on back provide control of air without removing the panel.



AIRFLO T-4 Grid



AIRFLO T-2 Grid

SA

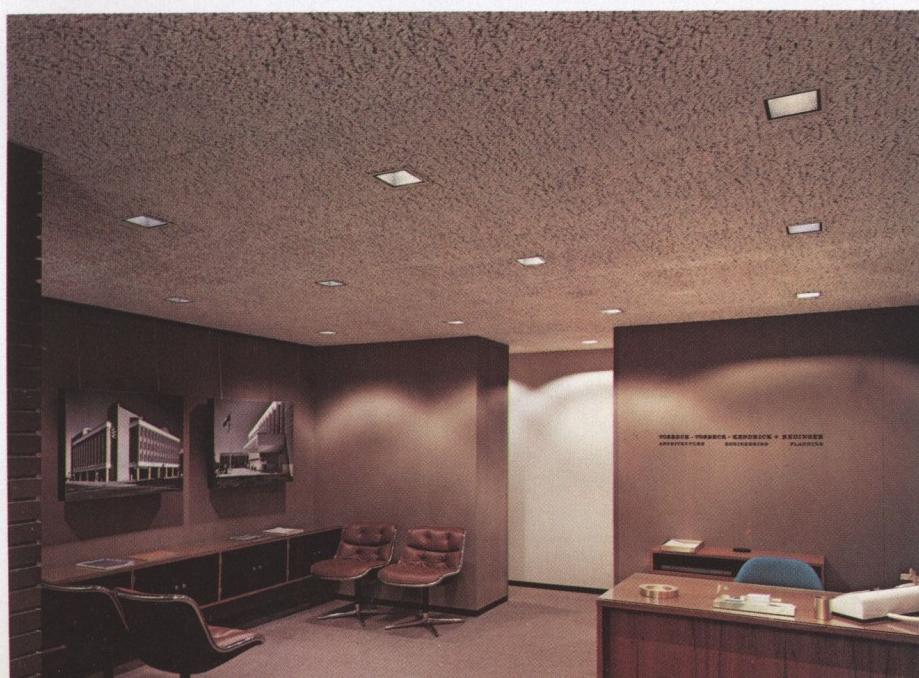
905

USG sound control ceilings



Classroom ceiling of Fissured AURATONE Panels uses the AIRFLO T-4 Grid System to distribute air evenly and quietly.

ANOKA SENIOR HIGH SCHOOL, Anoka, Minn.
Architect: ARMSTRONG, SCHLICHTING, TORSETH & SKOLD, Inc.



Elegance and comfort are combined in Glacier AIRSON ACOUSTONE Tile slotted A-2 in this architectural office.

VOSBECK, VOSBECK, KENDRICK, REDINGER Offices,
Alexandria, Va.
Architect: VOSBECK, VOSBECK, KENDRICK, REDINGER

sound absorption/flame resistance/light reflection

product	thick- ness	mount- ing	sound absorption coefficients						NRC range	light refl. class	flame resistance SS-S-118a class	flame spread E84 index	unit size tested
			125	250	500	1000	2000	4000					
ACOUSTONE Tile "F" Fissured	3/4"	1	.09	.26	.79	.97	.84	.91	.65-.75	a	25	15	12"x12"
		7	.58	.62	.58	.79	.94	.97	.70-.80	a	25	15	12"x12"
Glacier	3/4"	1	.10	.28	.81	.92	.84	.95	.65-.75	b	25	15	12"x12"
		7	.50	.58	.56	.81	.95	.99	.70-.80	b	25	15	12"x12"
Finesse	3/4"	7	.48	.53	.55	.77	.85	.83	.65-.75	a	25	15	12"x12"
Seacrest	3/4"	7	.34	.34	.69	.93	.98	.99	.70-.80	b	25	15	24"x24"
Foil-Backed ACOUSTONE Tile													
Fissured	3/4"	7	.45	.46	.62	.91	.96	.98	.70-.80	a	25	15	12"x12"
Glacier	3/4"	7	.30	.46	.77	.99	.89	.90	.75-.85	b	25	15	12"x12"
ACOUSTONE "90" Fissured	3/4"	7	.83	.73	.68	.87	.93	.73	.75-.85	a	25	15	12"x12"
ACOUSTONE "120" Fissured	3/4"	7	.52	.50	.60	.95	.99	.97	.70-.80	a	25	15	12"x12"
ACOUSTONE "180" Fissured	3/4"	7	.45	.48	.62	.97	.96	.96	.70-.80	a	25	15	12"x12"
ACOUSTONE "PC" Fissured	3/4"	1	.22	.21	.78	.99	.78	.59	.65-.75	a	25	15	12"x12"
		7	.70	.63	.67	.82	.86	.62	.70-.80				
MOTIF'D ACOUSTONE Striated	3/4"	1	.03	.26	.77	.93	.83	.78	.65-.75	a	25	15	12"x12"
		7	.80	.69	.66	.86	.90	.87	.75-.85	a	25	15	12"x12"
Foil-Backed MOTIF'D ACOUSTONE Galaxy	3/4"	7	.58	.46	.69	.91	.80	.76	.65-.75	a	25	15	12"x12"
AIRSON ACOUSTONE "A-2" Fissured, slotted (1)	3/4"	7	.85	.49	.68	.98	.92	.88	.70-.80	a	25	15	12"x12"
AIRSON ACOUSTONE "A-5" Fissured, slotted (2)	3/4"	7	.81	.48	.65	.94	.93	.84	.70-.80	a	25	15	12"x12"
AURATONE Panels													
Fissured	5/8"	7	.35	.38	.61	.75	.59	.54	.55-.65	a	25	25	24"x48"
	3/4"	7	.37	.46	.74	.94	.81	.79	.70-.80	a	25	25	24"x48"
Pin-Perforated	5/8"	7	.35	.40	.64	.72	.50	.40	.50-.60	a	25	25	24"x48"
	3/4"	7	.35	.46	.76	.95	.76	.64	.70-.80	a	25	25	24"x48"
Random (4)	5/8"	7	.40	.46	.60	.99	.87	.58	.70-.80	a	25	25	24"x48"
Filigree	5/8"	7	.33	.39	.60	.75	.65	.66	.55-.65	a	25	25	24"x48"
Nordic	5/8"	7	.35	.35	.62	.72	.51	.41	.50-.60	a	25	25	24"x48"
AURATONE FIRECODE Panels													
Fissured	5/8"	7	.29	.37	.66	.74	.59	.53	.55-.65	a	25	25	24"x48"
Pin-Perforated	5/8"	7	.28	.38	.70	.71	.51	.40	.55-.65	a	25	25	24"x48"
Filigree	5/8"	7	.31	.36	.66	.76	.65	.65	.55-.65	a	25	25	24"x48"
AIRSON AURATONE Panels													
Fissured, 50% A-5 Slotted (2)	5/8"	7	.29	.33	.58	.79	.66	.57	.60-.70	a	25	25	24"x48"
50% A-2 Slotted (1)	5/8"	7	.27	.34	.58	.82	.71	.60	.60-.70	a	25	25	24"x48"
AIRSON AURATONE FIRECODE Panels, Fissured													
50% A-5 Slotted	5/8"	7	.29	.34	.59	.71	.64	.57	.55-.65	a	25	25	24"x48"
50% A-2 Slotted	5/8"	7	.27	.32	.58	.72	.61	.63	.55-.65	a	25	25	24"x48"
AURATONE FIRECODE HF Panels													
Pin-Perforated	3/4"	7	.27	.32	.64	.76	.64	.57	.60-.70	a	25	25	24"x48"
AURATONE Tile													
Fissured	3/4"	7	.40	.38	.68	.79	.69	.64	.60-.70	a	25	25	12"x12"
Pin-Perforated	3/4"	7	.41	.43	.68	.86	.73	.59	.65-.75	a	25	25	12"x12"
	5/8"	7	.43	.40	.54	.92	.88	.68	.65-.75	a	25	25	12"x12"
	5/8"	1	.06	.13	.67	.99	.86	.72	.60-.70	a	25	25	12"x12"
Random (6)	1/2"	1	.02	.15	.58	.98	.71	.49	.55-.65	a	25	25	12"x12"
	3/4"	7	.43	.34	.62	.93	.79	.58	.60-.70	a	25	25	12"x12"
	1/2"	1	.09	.24	.60	.63	.62	.54	.45-.55	a	25	25	12"x12"
Filigree	3/4"	7	.39	.40	.67	.81	.75	.76	.60-.70	a	25	25	12"x12"
AURATONE FIRECODE Tile													
Fissured	3/4"	7	.36	.39	.66	.87	.74	.62	.60-.70	a	25	25	12"x12"
	5/8"	7	.42	.38	.60	.89	.76	.68	.60-.70	a	25	25	12"x12"
Pin-Perforated	3/4"	7	.38	.39	.66	.88	.72	.51	.60-.70	a	25	25	12"x12"
	5/8"	7	.41	.39	.62	.91	.72	.56	.60-.70	a	25	25	12"x12"
Random (6)	3/4"	7	.34	.38	.69	.92	.71	.53	.65-.75	a	25	25	12"x12"
Filigree	5/8"	7	.42	.39	.58	.87	.78	.73	.60-.70	a	25	25	12"x12"
VISTA SONIC Mirrored Panels	5/8"	7	.32	.28	.35	.42	.46	.61	.35-.45	a	25	10	24"x24"

NOTE: All surfaces tested were painted. Mounting No. 1—adhesive application to gypsum board. Mounting No. 2—stapling or nailing to wood strips. Mounting No. 7—metal suspension system. Also see Footnotes, page 25.

sound attenuation properties

product	thick- ness	mount- ing	sound attenuation factors - db												unit size tested
			125	175	250	350	500	700	1000	1400	2000	2800	4000	STC	
Foil-Backed ACOUSTONE Tile Fissured	(Also see 16-freq. section below)														12"x12"
AURATONE Regular Panels Fissured	(Also see 16-freq. section below)														24"x48"
Pin-Perforated															40-44
Pin-Perforated PC Random															35-39
AIRSON A-5 Fissured															40-44
AIRSON A-2 Fissured															35-39
AURATONE FIRECODE Panels Fissured															24"x48"
Pin-Perforated															40-44
AIRSON A-5 Fissured															35-39
AIRSON A-2 Fissured															35-39
AURATONE Regular Tile Fissured															12"x12"
Pin-Perforated															24"x24"
AURATONE FIRECODE Tile Fissured															12"x12"
Pin-Perforated															12"x12"
Random															12"x12"

product	thick- ness	mount- ing	sound attenuation factors - db												unit size tested					
			125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	STC	
ACOUSTONE Tile Fissured	3/4"	Ad(5)	37	44	46	43	48	52	53	51	52	57	60	>60	>60	>60	>60	55-60	12"x12"	
	3/4"	ICF	29	37	34	27	27	28	30	31	32	34	38	44	50	56	58	59	35-39	12"x12"
Finesse	3/4"	ICF	29	36	34	26	25	27	28	27	28	29	32	36	39	43	48	52	30-34	12"x12"
Foil-Backed ACOUSTONE Tile Fissured	3/4"	IET	29	38	36	29	30	33	34	34	36	39	43	46	51	54	56	56	35-39	12"x24"
Glacier Seacrest	3/4"	CE(7)	27	34	36	29	30	34	36	40	40	42	44	43	44	44	46	47	40-44	24"x24"
	3/4"	CE(7)	28	36	38	30	32	36	39	42	42	44	45	46	46	50	50	40-44	24"x48"	
	3/4"	CE	28	34	35	29	29	32	33	37	39	40	40	44	45	45	46	47	35-39	24"x24"
ACOUSTONE "120" Tile Fissured	3/4"	ICX	32	39	38	32	32	36	38	38	40	44	46	52	56	>60	>60	40-44	12"x12"	
AIRSON ACOUSTONE Tile Fissured, 50% A-5	3/4"	ICF	28	34	33	26	26	29	30	31	33	36	40	45	49	52	52	55	35-39	12"x12"
AURATONE Panels Fissured	5/8"	IE	30	38	37	30	32	36	38	42	44	47	50	53	55	56	56	59	40-44	24"x48"
	5/8"	CE	30	40	38	30	29	34	36	40	44	48	52	55	56	56	55	58	40-44	24"x48"
	5/8"	CEa	34	43	40	31	34	39	44	50	55	60	>60	>60	>60	>60	>60	45-49	24"x48"	
	5/8"	CEa	29	38	39	32	32	39	44	49	54	60	60	60	60	60	60	60	40-44	24"x48"
	5/8"	CEd	29	38	39	36	41	45	50	54	58	60	60	60	60	60	60	60	45-49	24"x48"
Pin-Perforated	5/8"	IE	32	39	36	31	32	36	37	40	44	48	52	55	58	59	58	>60	40-44	24"x48"
	5/8"	CE	31	40	39	31	30	34	36	40	44	49	53	56	58	58	58	>60	40-44	24"x48"
AURATONE FIRECODE HF Panels Fissured	3/4"	CE	30	37	38	31	30	35	34	40	43	47	50	53	55	56	56	57	40-44	24"x48"
USG Gypsum Ceiling Panels	1/2"	CE	34	40	41	34	36	40	41	42	44	46	47	48	48	44	41	41	40-44	24"x48"
	5/8"	CE	33	42	43	37	38	42	43	45	46	47	47	48	46	44	43	42	40-44	24"x24"

NOTE: All test results shown are from independent recognized laboratories; all surfaces tested were painted. Abbreviations, mountings: ICX—concealed suspension system, interrupted at partitions, but with accessible feature; Ad—adhesively attached; IE—exposed suspension system, interrupted at partitions; IET—same as IE but with concealed tees supporting tile in one direction; CE—exposed suspension system, continuous at partitions; ICF—concealed suspension system, interrupted at partitions, flat splines; CCF concealed suspension system, continuous at partitions, flat splines; CCT—same as CCF, except with tee splines; CEa—same as CE, but with one layer 1½" Sound Attenuation Blanket placed above ceiling, continuous; CEd—same as CE, but with two layers 1½" Sound Attenuation Blankets placed above ceiling, 4 ft. in each direction from partition. See also Footnotes below.

(1) Tile penetrated with two slots for AIRSON Tile Air Distribution System. (2) Tile penetrated with five slots for AIRSON Tile Air Distribution System. (3) Perforated in a random, pin-hole pattern. (4) Perforated 445 holes per sq. ft., 97 of $\frac{1}{16}$ " and 348 of $\frac{1}{8}$ " dia. (5) Tile adhesively attached to $\frac{1}{2}$ " gypsum panels screw-attached to indirect-hung suspension. (6) Perforated 437 holes per sq. ft., 98 of $\frac{1}{16}$ " and 339 of $\frac{1}{8}$ " dia. (7) Suspended on exposed T-grid. Tile is face-rabbeted on four edges.

Suspension Systems

concealed accessible Z-Spline systems

The concealed accessible systems are modified Z-spline suspensions designed to provide complete (or partial, where desired) accessibility to piping, electrical equipment, sheet metal work, and other mechanical devices in the plenum areas above the ceiling.

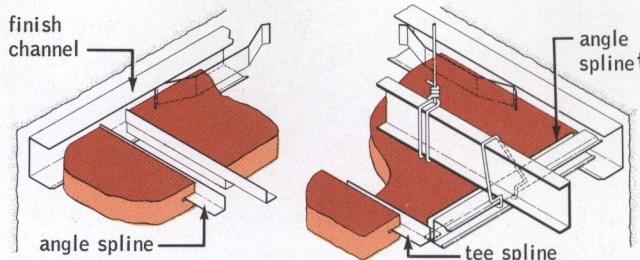
Removability of the tile is completely concealed; the appearance is that of standard Z-spline tile suspension. Only 1½" Z-spline and ¾" bevel edge 12"x24" tile are recommended for these systems, although they can accommodate ¾", 12"x12" tile.

concealed Z-Splines attached to 1½" carrying channel grillage

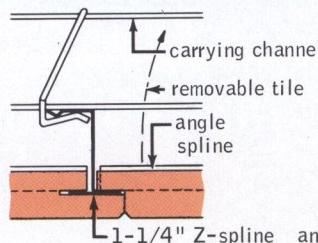
This method offers an economical, simple, rigid construction and permits the use of flush joints where lighting conditions are not too severe. Metal spline supports are provided in kerfs along the four edges of each unit. Splines also act as a continuous seal to minimize air travel through the joints. Self-leveling of the tile joints is assured since intersecting corners of four adjacent units are supported on the same member.

concealed Z-Splines direct to bar joists

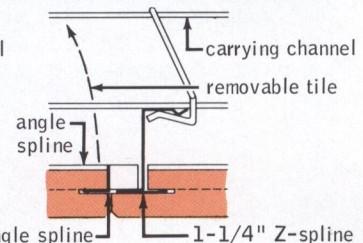
This method may be employed when bar joists are spaced a maximum of 5 ft. o.c. The Z-splines are attached direct to the bottom chord of the bar joist with the No. 87 clip. The saving gained by eliminating the 1½" channel is often lost in "shimming" since bar joists seldom form a true ceiling plane. It is therefore suggested this method only be used where headroom is critical.



concealed accessible shiplap

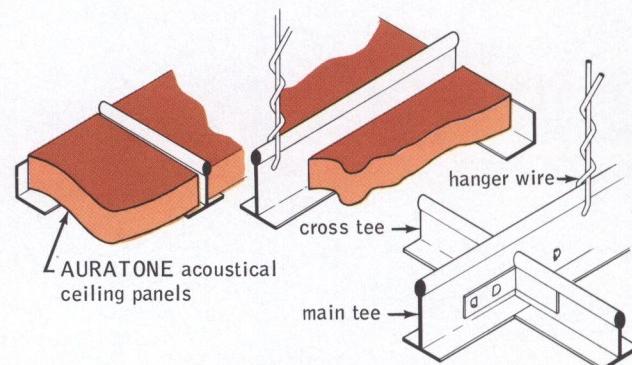
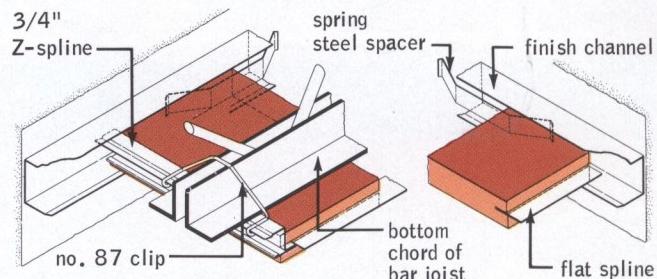
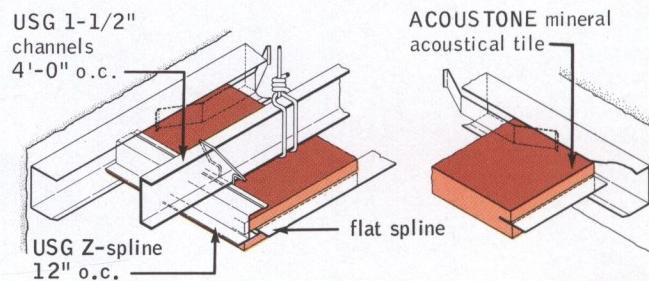


concealed accessible



direct-hung exposed grid

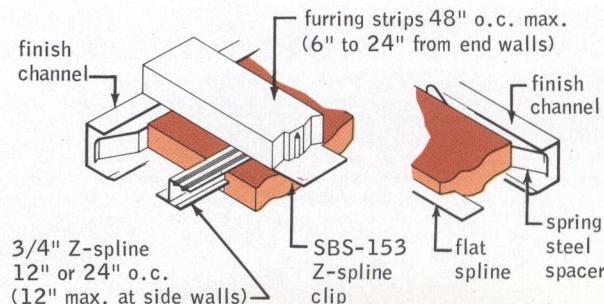
Because of its ease of installation, this method is economical and provides a low-cost acoustical ceiling with complete accessibility to the area above the ceiling. Any type lighting arrangement is easily adapted to it. Lighting troffers can be installed quickly and economically. Full advantage can be taken of the economy of gravity-held diffusers laid directly in the inverted tees to replace equivalent area of acoustical panels. This permits maximum flexibility of lighting arrangement.



wood furring direct attachment of Z-Spline

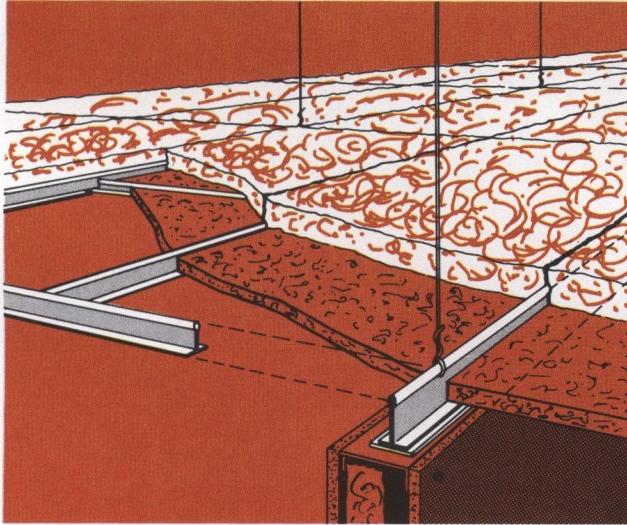
This method is particularly adaptable to existing ceilings where the surface is in such condition that it is impractical to attach tile by cementing.

Installation is by nailing wood furring strips, maximum spacing of 4 ft. o.c., and attaching Z-splines to the furring strips with the SBS-153 Clip. The SBS-153 Clip may also be used to attach Z-splines directly to existing wood joists or to wood furring strips nailed to exposed concrete surfaces.

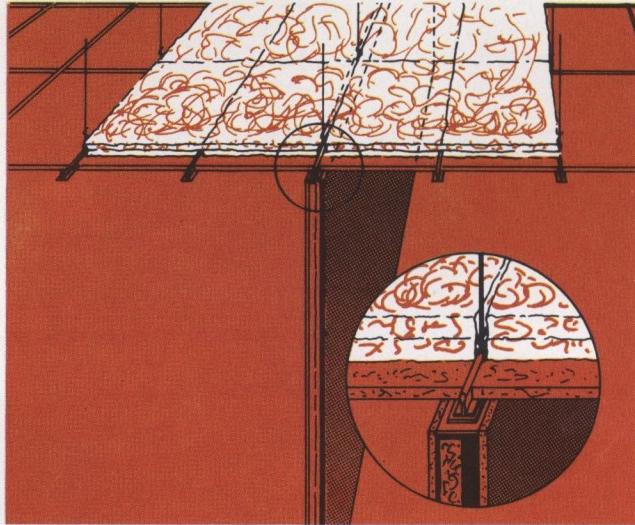


Wool-backed Panel Systems

Mounting CEA—Sound Attenuation Blankets over entire ceiling
—using $\frac{3}{4}$ " AURATONE Fissured Panels—STC 45-49
(see 16-freq. test listing, page 25)



Mounting CED—Double-layer Blankets 4 ft. each side of partition
—using $\frac{5}{8}$ " AURATONE Fissured Panels—STC 45-49
(see 16-freq. test listing, page 25)



specifications

notes to architect

- United States Gypsum-recommended contractors are highly trained specialists in the installation and design of U.S.G. sound control systems. They are well-equipped to survey your job, make recommendations and estimates, and help solve functional and esthetic problems that may be encountered. Should the problem be beyond the scope of a U.S.G. contractor, he will recommend a competent acoustical consultant who may advise you.
- U.S.G. sound control contractors will usually arrange for layouts and detailing for jobs. Architects may, however, prefer to furnish the layouts.
- U.S.G. acoustical products, except AURATONE FIRECODE HF, are designed for installation and use under standard occupancy conditions at no more than 80% RH.

Part 1: general

1.1 scope—Specify areas to receive this acoustical treatment.

1.1.1 work included (AIRSON)—AIRSON Air Distribution System including acoustical material and suspension system, zoning and sealing of plenum space.

1.1.2 work by others (AIRSON)—Heating and cooling plants including ductwork to plenum zones, wall and ceiling return-air grilles, auxiliary heating and cooling units, electrical fixtures and other equipment to be incorporated in the ceiling suspension systems. All overhead architectural, mechanical, and electrical work shall be completed prior to installation of the system.

1.2 qualifications

Construction conditions shall comply with ASTM C636.

Acoustical material and suspension systems, including necessary hangers, grillage, splines, and other hardware supporting the acoustical material shall be furnished and installed by a (contractor approved) (AIRSON Contractor licensed) by United States Gypsum Company.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. Immediately prior to installation, tile and panels shall be stored for a sufficient time to stabilize at temperature and humidity conditions ambient during installation, and anticipated during occupancy.

1.4 environmental conditions

Installation of (acoustical tile or panels shall not begin until building is enclosed, permanent heating and cooling equipment in operation, and residual moisture from plaster, concrete or terrazzo work dissipated.) (USG Exterior Gypsum Panels shall not begin until protection from direct exposure to water and weather has been provided.)

1.5 design conditions

System shall be rated NRC () in accordance with ASTM C423 and STC () in accordance with AMAI-II as tested by an independent agency.

Part 2: products

2.1 materials

2.1.1 Acoustone Mineral Acoustical (Tile) (Panels) by United States Gypsum, (Glacier) (Fissured) (Finesse) (Seacrest) (Domino) pattern, white color, $\frac{3}{4}$ " thick, (length x width), (bevel) (square) (Shadow Line) (Accent) edge, noncombustible class 25, molded mineral fiber units having natural fissured surface, 18 pcf min. density, (with non-breathing factory-applied aluminum foil backing,) (factory-applied acrylic plastic surface coating).

2.1.2 Motif'd Acoustone Mineral Acoustical Tile by United States Gypsum, (Georgian) (Striated) (Fantasia) (Galaxy) (Custom) pattern, white color, $\frac{3}{4}$ " thick, 12"x12", square edge, noncombustible class 25, molded mineral fiber units having natural fissured surface patterned by brushing, 18 pcf min. density, (with non-breathing factory-applied aluminum foil backing) (factory-applied acrylic plastic surface coating).

2.1.3 Acoustone (90) (120) (180) Mineral Acoustical (Tile) (Panels) by United States Gypsum, approved for UL Design No. (), () pattern, white color, $\frac{3}{4}$ " thick, (12"x12") (24"x24"), (square) (bevel) (Shadow Line) (Accent) edge, 18 pcf min. density, (factory-applied acrylic plastic surface coating).

2.1.4 AIRSON Acoustone (120) Mineral Acoustical Tile by United States Gypsum, (approved for UL Design No. (),) (Fissured) (Glacier) pattern, white color, $\frac{3}{4}$ " thick, (length x width), (square) (bevel) edge, noncombustible class 25, ()% A-2 slotted, ()% A-5 slotted, ()% unslotted, factory-applied non-breathing aluminum foil backing, 18 pcf min. density, (factory-applied acrylic plastic surface coating).

2.1.5 Acoustone Mineral Acoustical Space Units by United States Gypsum, (Finesse) (Glacier) pattern, white color, $2\frac{1}{4}$ " thick, $10\frac{1}{2}" \times 10\frac{1}{2}"$, 18 pcf min. density.

USG sound control ceilings

2.1.6 AURATONE Acoustical Tile by United States Gypsum, (Pin-Perforated) (Random) (Fissured) (Filigree) (Nordic) pattern, (1/2") (5/8") (3/4") thick, (length x width), (staple flange) (butt bevel) (bevel with kerf) (24"x24" Shadow Line) edge, noncombustible class 25, mineral fiber ceiling tile, (factory-applied acrylic plastic surface coating).

2.1.7 AURATONE Acoustical Panels by United States Gypsum, (Pin-Perforated) (Random) (Fissured) (Filigree) (Nordic) pattern, (5/8") (3/4") thick, (length x width), noncombustible class 25, mineral fiber ceiling panels, (factory-applied acrylic plastic surface coating).

2.1.8 AURATONE FIRECODE Acoustical Tile by United States Gypsum, approved for UL Design No. (), (Fissured) (Filigree) (Pin-Perforated) (Random) (Nordic) pattern (5/8") (3/4") thick, (12"x12") (12"x24") (24"x24"), (tongue & groove) (bevel) (square) edge, (factory-applied acrylic plastic surface coating).

2.1.9 AURATONE FIRECODE Acoustical Panels by United States Gypsum, approved for UL Design No. (), (Fissured) (Filigree) (Pin-Perforated) (Nordic) pattern, 5/8" thick, (length x width), (factory-applied acrylic plastic surface coating).

2.1.10 AURATONE FIRECODE HF Acoustical Panels by United States Gypsum, approved for UL Design No. (), capable of withstanding temperature-humidity extremes, (Pin-Perforated) (Nordic) pattern, 3/4" thick, (length x width), (factory-applied acrylic plastic coating).

2.1.11 AIRSON AURATONE FIRECODE Acoustical Panels by United States Gypsum, approved for UL Design No. (), (Fissured) (Filigree) (Pin-Perforated) (Nordic) pattern, 5/8" thick, 24"x(24") (36") (48") (60"), noncombustible class 25, mineral fiber ceiling panels, ()% A-2 slotted, ()% A-5 slotted, ()% unslotted (factory-applied acrylic plastic surface coating).

2.1.12 AIRSON AURATONE FIRECODE Acoustical Tile by United States Gypsum, approved for UL Design No. (), (Fissured) (Filigree) (Pin-Perforated) (Nordic) pattern, (5/8") (3/4") thick, (12"x12") (24"x24"), (bevel) (tongue and groove) edge, noncombustible class 25 mineral fiber ceiling panels, ()% A-2 slotted, ()% A-5 slotted, ()% unslotted, (factory-applied acrylic plastic surface coating).

2.1.13 VISTA SONIC Mirrored Ceiling Panels by United States Gypsum, 15/16" thick, (24"x24") (24"x48").

2.1.14 USG (FIRECODE) Interior Gypsum Ceiling Panels by United States Gypsum, (approved for UL Design No. G222) () pattern nom. 1/2" thick, (24"x24") (24"x48"), noncombustible.

2.1.15 USG Exterior Gypsum Ceiling Panels by United States Gypsum, () pattern, nom. 1/2" thick, (24"x24") (24"x48"), noncombustible.

2.1.16 THERMAFIBER Light Fixture Protection by United States Gypsum, approved for UL Design No. (), (box) (tent) type assembly, nom. 1 1/4" thick, noncombustible semi-rigid mineral fiber board.

2.1.17 fire-rated suspension—Per UL Design No. () and ASTM C635.

2.1.18 concealed spline suspension—3/4" Z-spline spaced 12" o.c., attached to 1 1/2" channel grillage. Flat metal splines engage adjacent tile.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, ACOUSTONE, MOTIF'D, AIRSON, AURATONE, ACOUSTISORBER, FIRECODE, SHEETROCK, ROCKLATH, TEXOLITE, THERMAFIBER, AIRFLO, MASTICAL, VISTA SONIC, TAL.

Note: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

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2.1.19 one-way exposed spline suspension (48")—Commercially available suspension system meeting "intermediate" (or better) structural standards of ASTM C635, having main member exposed, supporting acoustical tile on all four sides using appropriate angle or tee splines between adjacent tile.

2.1.20 exposed grid (or Shadow Line) suspension—Inverted tee, direct hung system meeting "intermediate" (or better) structural standards of ASTM C635.

2.1.21 concealed accessible (shiplap) spline suspension—1 1/4" Z-spline spaced 24" o.c., attached to 1 1/2" channel grillage. Back-to-back angle splines engage adjacent tile to provide (specify %) accessibility to plenum. Tee and angle splines support remaining tile.

Part 3: execution

3.1 suspended—Install acoustical material and suspension system, including necessary hangers, grillage, splines and other hardware supporting the acoustical material in accordance with UL Design No. () and ASTM C636.

3.2 fissured tile—Intermix tiles from 4 or more cartons to obtain uniform distribution of fissure variations.

3.3 adhesive—Apply acoustical material, using an adhesive manufactured specifically for applying acoustical tile, in accordance with adhesive manufacturer's directions. Insert fiber splines in kerfs at corners of units.

3.4 ACOUSTONE Space Units—Lay out preliminarily where permanent lighting conditions can be simulated, with fissures normally horizontal. Where necessary rotate units 180°—fissures are directional—for satisfactory overall appearance. Install in the same arrangement, taking care not to invert them, with (Spin-on) (Snap-on) Wall Clip attached with suitable fasteners to wall or ceiling. Attach (Spin-on) (Snap-on) Clip to Space Unit with 1 1/2" USG Type G Bugle Head Screw or #10-24 machine screw.

3.5 light fixture protection—Install THERMAFIBER Light Fixture Protection, and necessary hangers and ties, in accordance with UL Design No. () and ASTM C635.

3.6 air distribution

a. Attach AIRSON slides to the back side of all except center A-5 tile slots so that air passage through the slots can be controlled from the room side of the tile by means of a pointed instrument without removing the (tile) (panels) from the ceiling.

b. Check all drawings and job conditions and ascertain code or other requirements for covering and sealing the top and sides of the plenum space above the ceiling. Seal the plenum space tight against air leakage. Insulate all walls of the plenum space exposed to outside temperatures with insulation rated at least R-11 installed resistance.

c. Furnish zone barriers and install where shown on drawings. Turn top edge at least 2", coat with adhesive, and permanently hold in place with sheet metal angle fastened securely. Lap all edges at least 2" and cement together. Lap bottom edges at least 3" on the back of the (tile) (panels) and cement directly to the (tile) (panels).

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CEILING DYNAMICS

environmental ceilings

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INTEGRATED CEILINGS
acoustical, air distribution, lighting

UNITED STATES GYPSUM

FEATURES OF CDI PRE-ENGINEERED, INTEGRATED ENVIRONMENTAL CEILING ASSEMBLIES

- maximum design flexibility
- glare-free lighting
- adjustable air distribution
- efficient sound control
- noncombustible fire protection
- economical installation

Total concept

Environmental ceilings have received widespread acceptance because of their multi-functional performance, flexibility to meet design needs and savings in initial operating costs. These integrated assemblies combine suspension, ceiling finish, lighting, air distribution and sound control into one subsystem. They make it easier to design, specify, coordinate, control and install interior ceiling systems.

Single responsibility

With this approach, one contractor is responsible for the final system's performance and appearance, eliminating multiple supervision common to standard ceiling construction. Because the systems are engineered at the factory, components interface properly and provide predictable results. The high cost of fabrication and installation in the field is eliminated.

Job-proven

Backed by a record of hundreds of successful jobs, Ceiling Dynamics offers architects and engineers a diverse series of systems and options to satisfy most design criteria. Suitable for all types of buildings, these assemblies are a boon to architectural creativity. Five basic systems, two of which are described here, are all integrated to provide engineered performance characteristics. The components of these ceilings can be varied or mixed to meet functional needs.

Flexible design

Architectural design is enhanced by coffered modules or flat ceilings in square, rectangular or one-way suspension systems that complement any ceiling shape. Many module sizes are available, and special modules may be engineered to mullion or column spacing. Steel or aluminum runners have low-sheen finish; exposed aluminum may be color-anodized to match other construction. Attachment and relocation of partitions are simplified; all systems are accessible and allow entrance to the plenum without damage to the components.

Lighting

Luminaires are manufactured specifically for each system with appropriate hardware and supports for easy, economical installation. Most fixtures rate exceptionally high on ESI and VCP scales and meet the scissors curve criteria without sacrificing lumen efficiency. Fixtures can be static or air-handling to control or utilize heat from lights.

Air distribution

A wide range of methods and techniques is available for air distribution including linear, perimeter and modular devices. Varying slot widths and inlet sizes permit distribution that meets most requirements. VARIAMATIC (variable volume, constant temperature) and AIRSON (pressurized plenum) Air Distribution Systems are also readily integrated into these assemblies.

Sound control

Acoustical panels for these assemblies are selected from United States Gypsum's broad variety of noncombustible mineral fiber products: AURATONE Panels in eight patterns with absorption up to .70-.80 NRC avg. and attenuation up to 40-44 STC; ACOUSTONE Panels in four patterns with absorption up to .75-.85 NRC avg. and attenuation up to 40-44 STC. If desired, ACOUSTONE Panels can be integrally colored to match or harmonize with surroundings.

CDI-approved contractors

To assure high-quality installation, CDI Environmental Ceiling Systems are available through dependable contractors carefully selected and licensed by Ceiling Dynamics. These recommended contractors are highly trained specialists in the design of the system and are well-equipped to survey the job, make recommendations and estimates and help architects and engineers solve functional and esthetic problems that may be encountered. Specifications, photometric and air distribution data are available from the contractor and from Ceiling Dynamics national and regional sales offices.

CDI DELTA II Environmental Ceiling in NCNB Tower, Charlotte, N.C.
Architects: ODELL ASSOCIATES, Inc. THOMPSON, VENTULETT & STAINBACK, Inc.



MOD SERIES ENVIRONMENTAL CEILING SYSTEMS

High-performance modular systems offer esthetic design flexibility

The MOD Series Environmental Ceiling Systems provide a modular, fully accessible, coffered ceiling assembly with a great variety of options to meet esthetic and functional needs. The systems are available in standard modules as large as 6x6-ft. or in special sizes to meet spacing of other construction. Modules may be a combination of vaulted or flat panels, totally or partially illuminated.

The coffered design with luminaires at the apex provides uniform, glare-free and shadow-free lighting particularly suited to large, spacious rooms. The visual comfort probability (VCP) is higher than with the same number of fixtures in a flat ceiling.

The MOD V Ceiling System offers a 1-hr. fire rating—UL Design P222. The assembly tested consists of $\frac{5}{8}$ -in. AURATONE FIRECODE Ceiling Panels, 2x4-ft. light fixtures and linear air diffusers installed on a 60x60-in. MOD Grid System suspended from bar joists with 1 $\frac{1}{2}$ -in. steel roof deck and 1 $\frac{1}{16}$ -in. noncombustible insulation above.

This coffered design also provides as much as 20% more area for acoustical material than with conventional flat ceilings. The MOD V Ceiling System has achieved a 43 STC as tested by Geiger & Hamme, Inc. in accordance with AMA 1-II-1967 standards. The tested assembly consisted of AURATONE Ceiling Panels, 2x4-ft. light fixtures, main and cross runners with 2-in. wide regresses installed in a 60x60-in. module.

A specially designed runner, available in various regresses widths, provides for quiet, high-capacity air distribution with nine adjustable throw patterns. Partitioning is readily integrated with the ceiling and can be rearranged to provide flexible space control.

Design

Module size: 30x60-in., 48x60-in., 48x48-in., 60x60-in., 72x72-in. sizes are standard. Other sizes to meet special conditions, such as window wall or column spacing, are available on request.

Suspension system: main runner, cross runner and perimeter are formed of 24-ga. galvanized steel, finished white to match acoustical panels with non-specular black horizontal regresses. Available with $\frac{1}{2}$ -in. deep, plain or perforated regresses in widths from 1 to 4 in. in $\frac{1}{2}$ -in. increments or in special sizes to match mullion or partition widths. Other finishes available to correlate with the interior decor.



Effective combination of Glacier ACOUSTONE Tile and Pin-Perforated AURATONE Panels in a MOD Series Environmental Ceiling.

MOD SERIES

Illumination

Luminaires for MOD Series Ceilings are manufactured to strict Ceiling Dynamics specifications for high-efficiency lighting. Fixtures have 2, 4, or 8 F40 lamps and provide illumination levels up to 150 footcandles for small rooms, over 300 footcandles for larger spaces. Each fixture is tested in its appropriate vaulted configuration; data for 24x48-in. fixture shown at right. Photometric data for other fixtures are available from Ceiling Dynamics for design purposes.

Fixtures are fabricated from 22-ga. steel, with a bonderized white, reflective finish. They are suitable for use with all standard voltages and carry a UL label. Standard lenses are acrylic prismatic type in flat or wraparound designs; virtually all other types of lenses and diffusers are available. Fixtures with heat-exchange or air-handling features are available, if desired.

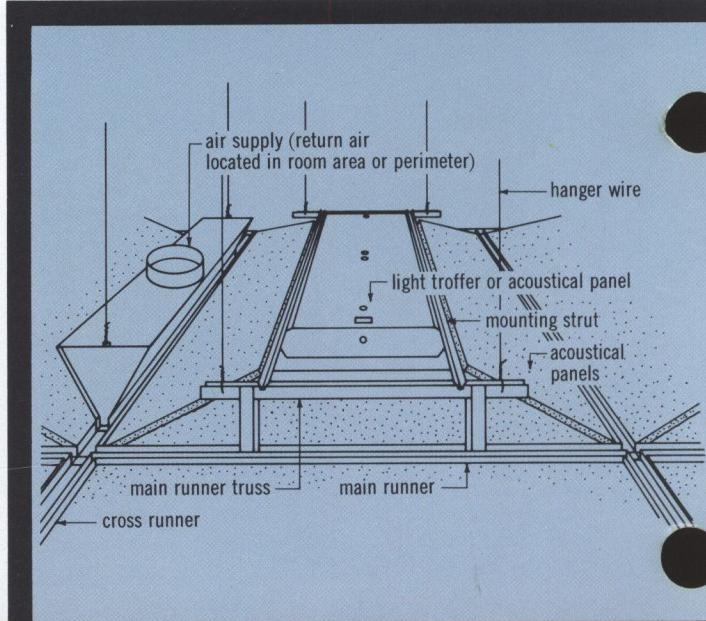
Fixture size: 5x48-in., 12x48-in., 24x24-in., 24x48-in., 30x30-in., 36x36-in., 48x48-in. sizes are available.

Air distribution

These systems feature ducted air terminals above the grid recess which provide sectionalized control and allow maximum flexibility in rearranging space. Each terminal contains two weirs which offer nine optional throw patterns and provide handy fingertip adjustment from below. Depending on the recess width, these terminals have capacities up to 400 cfm at NC 35 or less.

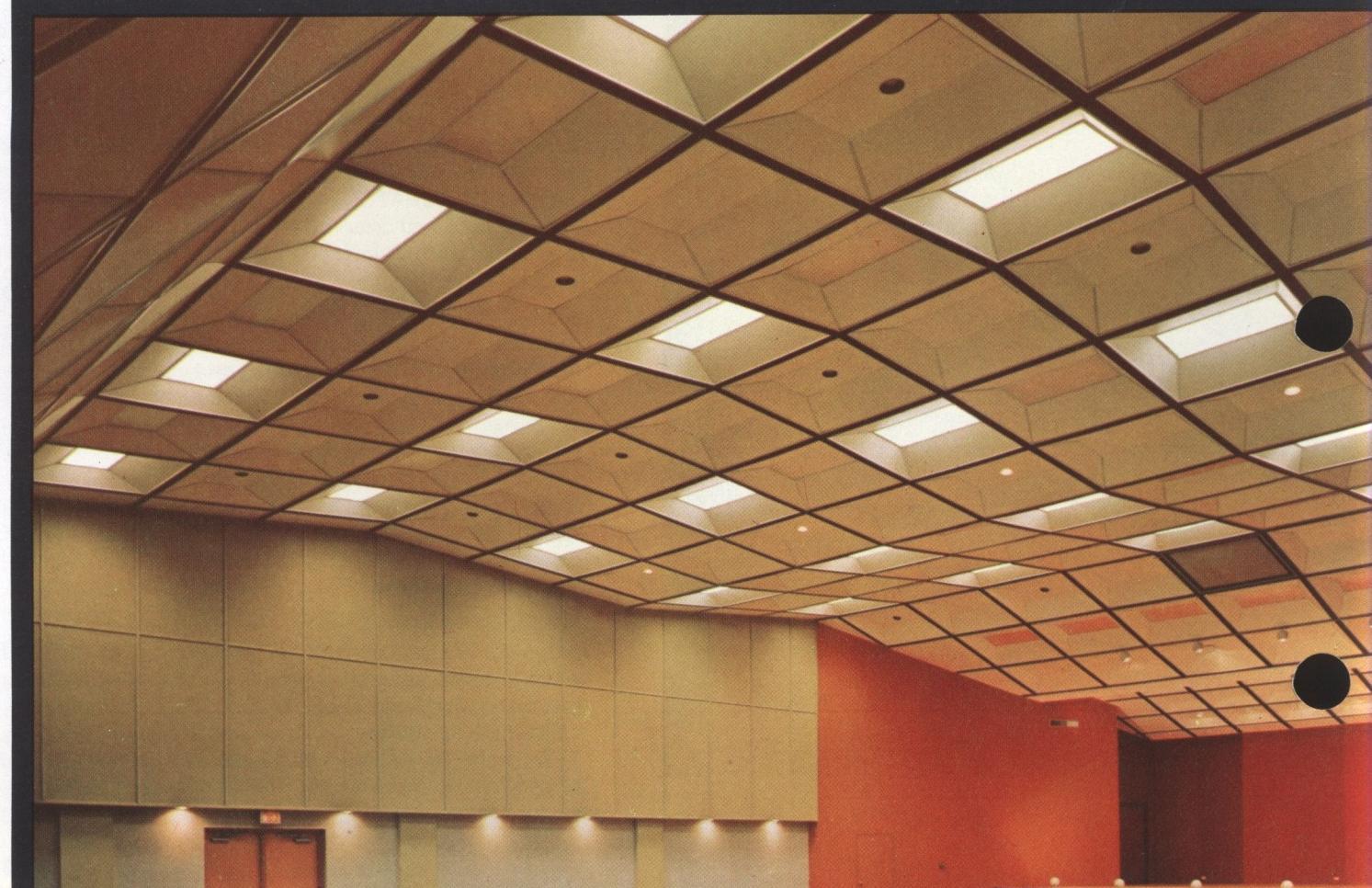
Specific performance data are available from Ceiling Dynamics for design purposes.

Return air is either ducted through the air terminals, returned to the plenum through the runners or perimeter which have slots or perforations in the recess, or handled through light fixtures. The light trap return, used over the runners, has an optional volume-control damper and acoustical lining for improving acoustical privacy.



OCALA MUNICIPAL AUDITORIUM, Ocala, Fla.
Architect: HAL THOMAS REID, AIA

MOD SERIES

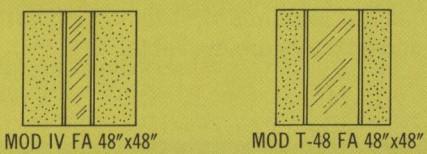


Reflected coffer views
showing flat or wrap-around acrylic lens fixtures

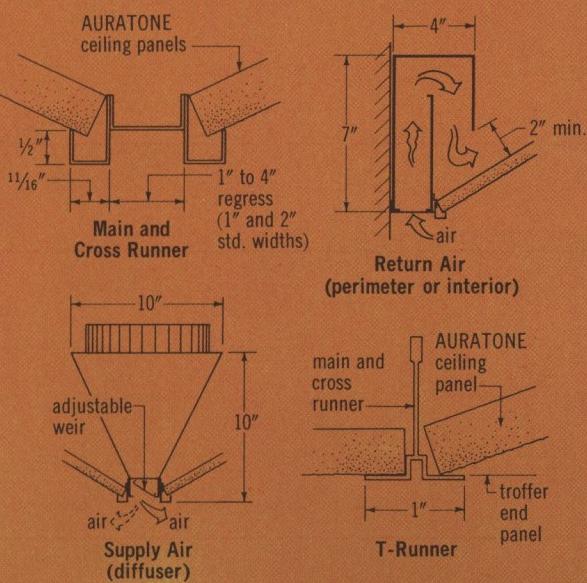
Regress Runner Series



T-Runner Series

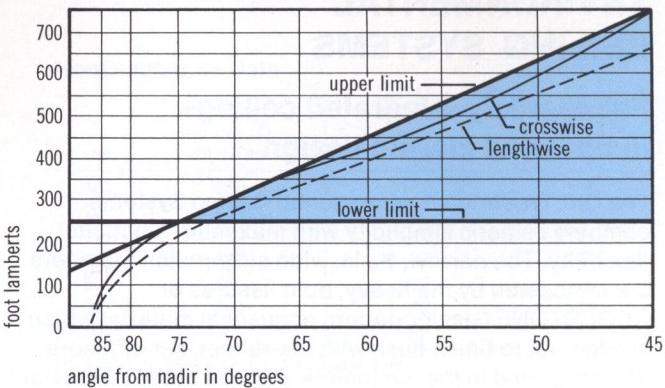


MOD SERIES



Average brightness curves

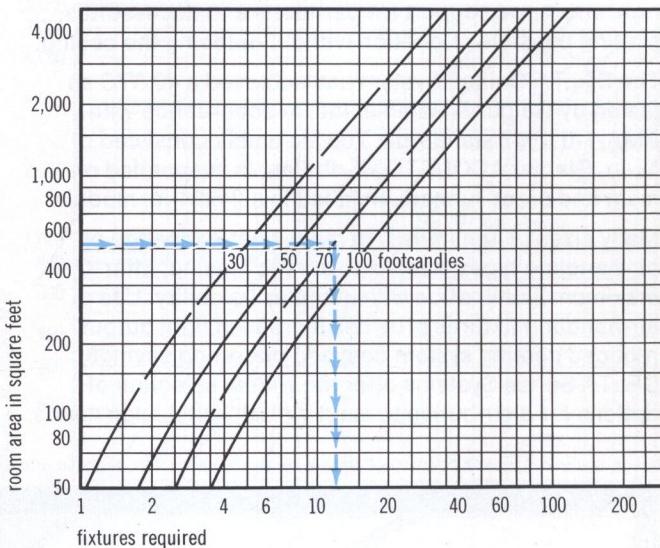
MOD-V Series Lighting Fixture: 2-lamp, 6" coffer, 2x4 ft.



Illumination levels data

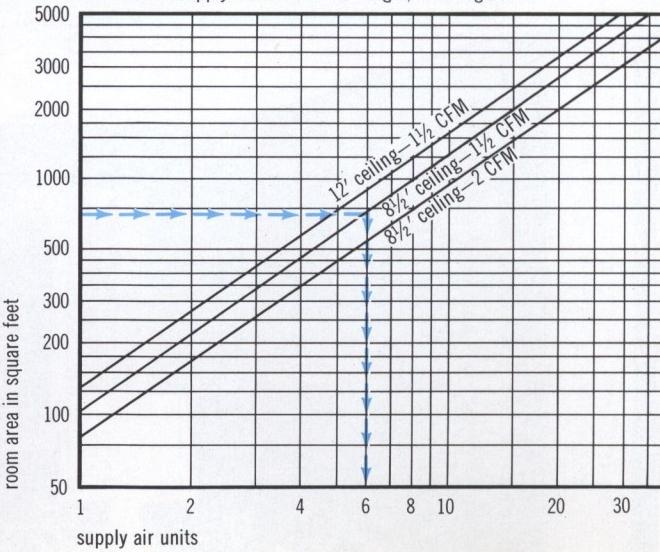
MOD Series Lighting Fixture: 2-lamp, 2x4-ft., acrylic prismatic lens, 75% maintenance factor.

Room reflectance: 80%/50%/20%; ceiling height: 9 to 10 ft.



Air-handling data

MOD Series Supply Air Unit: 48-in. length, 2-in. regressed.



DELTA SERIES

ENVIRONMENTAL CEILING SYSTEMS

Functionally integrated ceilings in beautiful classic design

The DELTA Series Environmental Ceiling Systems combine esthetic simplicity with maximum functional flexibility. The narrow, $\frac{3}{16}$ -in. wide suspension members are concealed by the heavy, bold fissures of ACOUSTONE Glacier pattern acoustical material which is edge-cut to finish flush with the runner. Air diffusers are integrated in the luminaires, located at the perimeter or handled on a modular basis, giving a large, clear expanse of uniformly textured ceiling.

These flat ceilings require less plenum space than vaulted or coffered designs and are fully accessible for maintenance and quick rearrangement of components. The unique runner with a continuous screw slot provides rigid structural support for partitions and accessories, making possible relocation without defacing the ceiling.

The DELTA Ceiling System has achieved a 40 STC as tested by Geiger & Hamme, Inc. in accordance with AMA-1-II-1967 standards. The assembly consisted of $\frac{3}{4}$ -in. Glacier ACOUSTONE db Panels suspended on main and cross runners installed in a 24x24-in. module.

Many sizes of luminaires, in plain, heat-exchange or air-handling types, each with acrylic lensing, offer maximum illumination with modular flexibility. Use of air-handling fixtures provides increased light output, reduced cooling system cost and operating savings. DELTA Series Systems offer the widest selection of options for distribution to meet virtually all design needs.

Design

Module size: 24x24-in., 30x30-in., 48x48-in., 60x60-in. sizes are standard. Other sizes up to 60x60-in. to meet planning requirements, are available on request.

Suspension system: DELTA Runners are of extruded 6063 alloy aluminum, with a continuous $\frac{1}{4}$ -20 screw slot, and a heavy-textured, frost-white enamel finish. Aluminum perimeter members are flush or have $\frac{1}{2} \times \frac{1}{2}$ -in. regress, adjustable controls and acoustical lining when used for air distribution. Perimeters are also available with solid blank-off and in a combination supply and return air member with drapery pocket.

Special colors: A series of integrally colored ACOUSTONE Acoustical Panels with matching suspension system is available.

Illumination

Luminaires for DELTA Series Ceilings are manufactured specifically for use in these systems and include all connecting hardware and supporting devices for fast installation. Fixtures have an unrestricted selection of lenses and/or diffusers and provide efficiency and illumination levels to meet most requirements. Fixture performance is tested in the integrated system; photometric data available from Ceiling Dynamics.

Fixtures, fabricated from 20-ga. steel with a bonderized white reflective finish, are suitable for use with all standard voltages and carry a UL label. Fixtures may have air supply and return slots or heat-exchange features in the frame.

Fixture size: 12x48-in., 24x24-in., 24x48-in., 30x30-in., 36x36-in. sizes are available.

Lens: Acrylic prismatic is standard; virtually all other types of lenses and diffusers are available.

Rough-textured Glacier ACOUSTONE Panels contrast with smooth, exposed grid in this DELTA Ceiling System.

DELTA SERIES



Air distribution

DELTA Series systems offer an unusually wide selection of integrated options for air distribution.

Linear diffusers: suitable for perimeter and interior zone air supply. Exterior wall units may include a combination supply and return member with drapery pocket.

Adjustable weirs provide six throw patterns and adjustable volume control in each slot. Units have one or two slots, slot widths and inlet sizes to meet all common capacity requirements. Acoustical lining and volume-control dampers, if required, are optional.

Perforated diffusers: available in 24x24-in. module to fit a variety of duct sizes. Provide supply air up to 900 cfm and handle return air up to 2,000 cfm at NC 35 or less, offer any combination or direction of 4-way throw.

Acoustical lining and opposed-blade dampers optional.

Light-troffer diffusers: all light fixtures have optional frames with air-handling slots capable of delivering up to 200 cfm at NC 35. An air pack fits over the troffer when ducted delivery or return is required.

VARIAMATIC System: used with single duct, variable volume—constant temperature distribution of conditioned air. See page 8 for details on this economical system.

AIRSON System: conditioned air is supplied to the pressurized plenum and forced downward through specially engineered, damped orifices in the acoustical panels. The system circumvents design and maintenance problems of ceiling diffusers and delivers draft-free air and a controllable comfort level (see page 8 for details).

CDI environmental ceilings

Heat exchange data

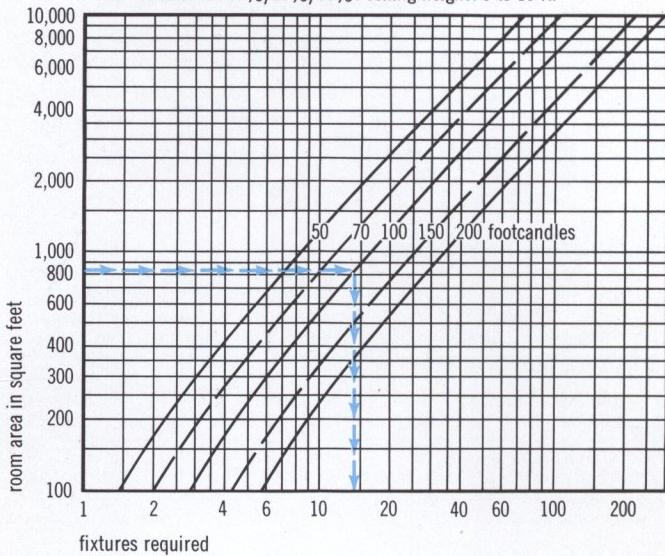
cfm	heat transfer (1) —BTU/hr	return air temp. —°F	relative light output—%
10	360	108	111
20	430	95	114
30	480	90	115
40	520	87	116
50	530	85	116
60	540	83	118
70	540	82	117

(1) Based on 75°F entering air temperature.

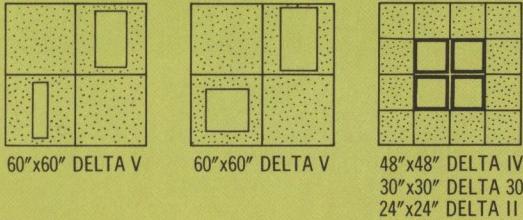
Illumination levels data

DELTA Series Lighting Fixture: 4-lamp, 2x4-ft. with two 2x2-ft. frames, acrylic prismatic lens, 75% maintenance factor.

Room reflectance: 80%/50%/30%: ceiling height: 9 to 10 ft.



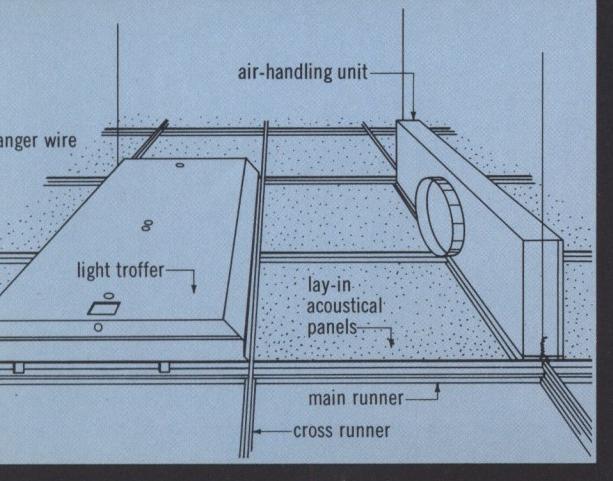
Reflected ceiling views showing flat acrylic fixtures



60"x60" DELTA V

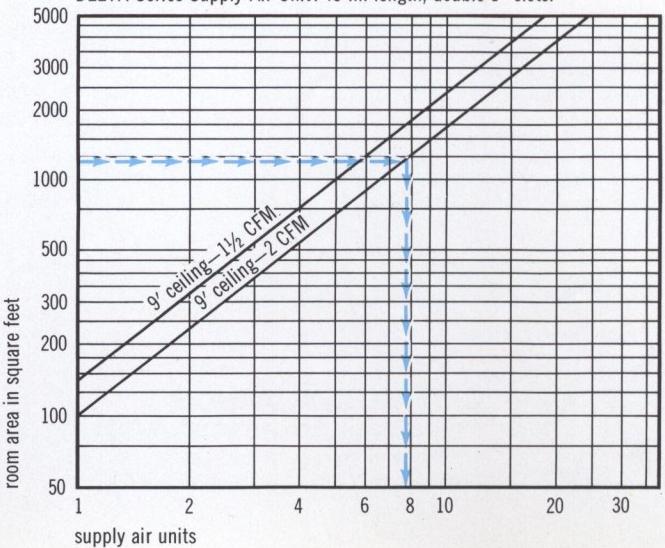
60"x60" DELTA V

48"x48" DELTA IV
30"x30" DELTA 30
24"x24" DELTA II



Air-handling data

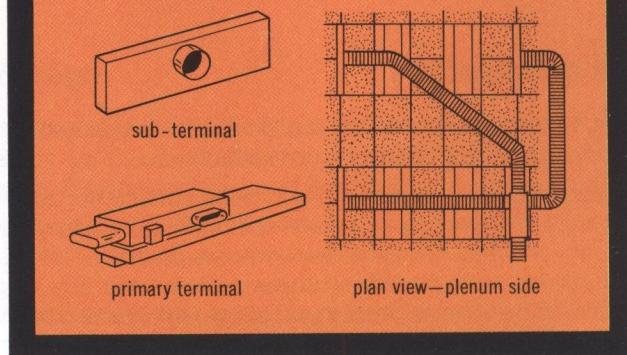
DELTA Series Supply Air Unit: 48-in. length, double 1" slots.



TECHNICAL DATA

CDI

ENVIRONMENTAL CEILING SYSTEMS



VARIAMATIC Air Distribution Systems

In the VARIAMATIC Air Distribution Systems, a variable volume of constant-temperature air is distributed to meet changing load requirements and offset heat created by lights and people. This popular concept offers superior comfort conditioning and zone control compared to conventional systems. It also reduces initial equipment cost and provides savings in operation.

Conditioned air, ducted to terminal units, is distributed to the space through two outlet slots which esthetically blend into the grid suspension. The modular design is integrated with the DELTA Series system. Terminals are available to fit most module sizes up to 60 in. and provide up to 240 cfm per unit. They are acoustically engineered and lined with a non-eroding, sound-absorbing material to assure low NC levels.

Primary terminals receive ducted air for distribution and govern up to three additional sub-terminal units. Volume control dampers in the primary unit, actuated by a wall-mounted or built-in thermostat, admit the exact quantity of cool air needed. Another built-in control prevents excessive flow caused by duct-pressure fluctuations. Field-adjustable dampers control the flow to the sub-terminals. Both primary and sub-terminals have rotating weirs which provide 1-way, 2-way and vertical throw patterns and have fingertip adjustment from below. The diffusers provide reasonably constant air motion for minimal and maximum flow without dumping. Specific air distribution data for design purposes are available from Ceiling Dynamics.

AIRSON Air Distribution Systems

In the AIRSON Air Distribution Systems, primary equipment supplies properly conditioned air to the plenum chamber above the acoustical ceiling. The air is forced through controlled jets in the ceiling to provide draft-free distribution and a controllable comfort level throughout the space. Suitable for both heating and cooling, the AIRSON Systems may be zoned to account for varying design requirements within the occupied space. Specific air distribution data for design purposes are available from Ceiling Dynamics.

Sound absorption values

product	thick- ness	mount- ing	sound absorption coefficients						NRC range	
			band center frequency—Hz							
			125	250	500	1000	2000	4000		
ACOUSTONE Tile										
Seacrest	3/4"	7	.34	.34	.69	.93	.98	.99	.70-.80	
Glacier	3/4"	7	.60	.73	.73	.93	.88	.90	.75-.85	
AURATONE Panels										
Pin-Perforated	5/8"	7	.30	.43	.74	.95	.73	.55	.65-.75	

Sound attenuation properties

product	thick- ness	mounting	sound attenuation factors—db																STC range
			125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
ACOUSTONE Tile																			
Seacrest	3/4"	CE	28	34	35	29	29	32	33	37	39	40	40	44	45	45	46	47	35-39
Glacier	3/4"	DELTA II (1)	30	36	38	31	31	33	36	38	39	41	42	45	47	48	49	50	40-44
AURATONE Panels																			
Pin-Perforated	5/8"	IE	32	39	36	31	32	36	37	40	44	48	52	55	58	59	58	>60	40-44
	5/8"	MOD V	26	34	36	34	34	36	39	42	43	43	44	48	49	49	49	50	40-44

Footnotes—Sound Characteristics Tables. All test results shown are from independent recognized laboratories. (1) Suspended on exposed Delta grid. Tile is face-rabbeted on four edges. All surfaces tested were painted.

Abbreviations, mountings: No. 7—metal suspension system; IE—exposed suspension system, interrupted at partitions; CE—exposed suspension system, continuous at partitions; MOD V—MOD V Series integrated ceiling system.



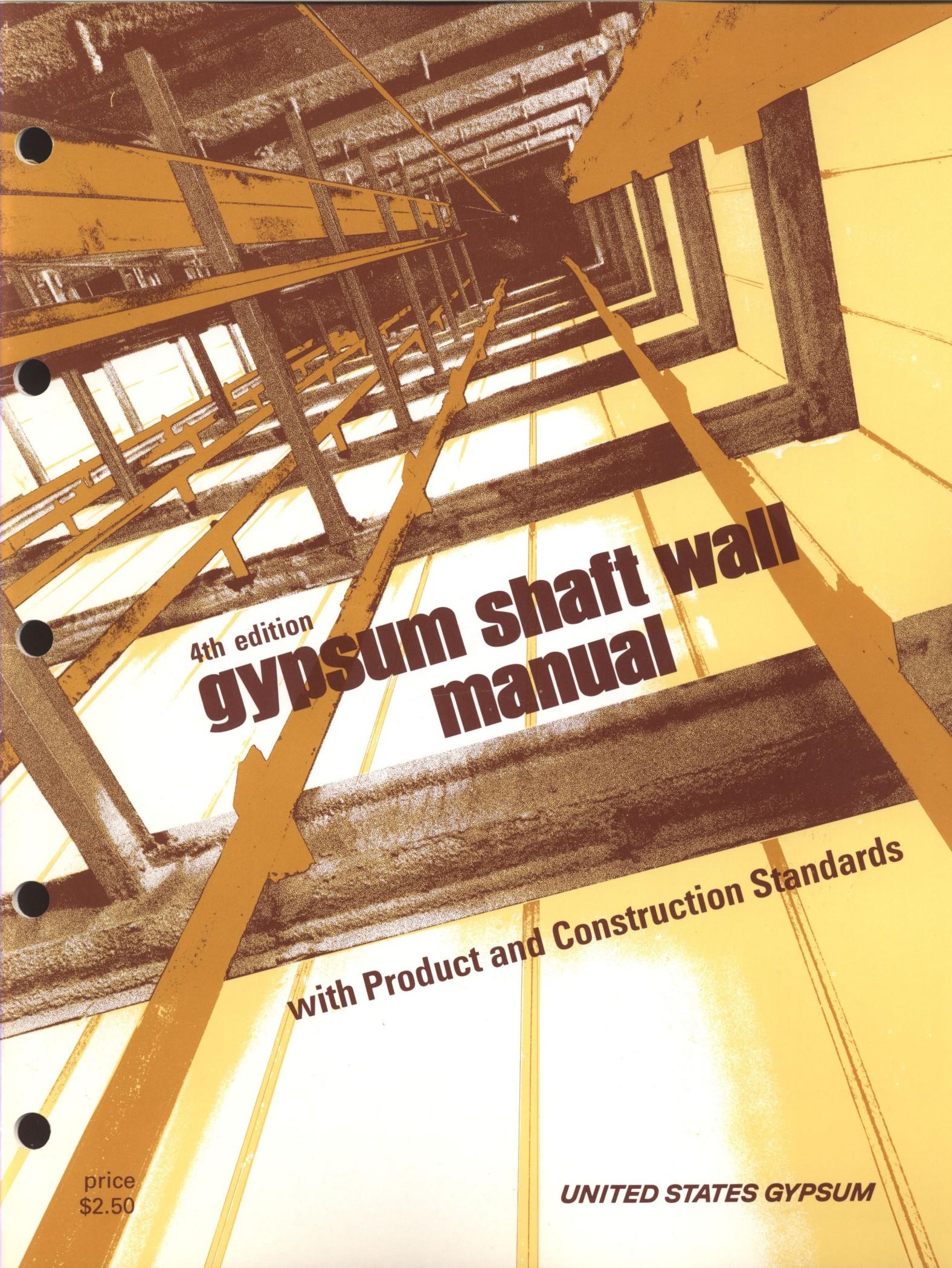
CEILING DYNAMICS

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Note: All products described here may not be available in all geographic markets. Consult nearest CDI sales office or representative for information.



4th edition

gypsum shaft wall manual

with Product and Construction Standards

price
\$2.50

UNITED STATES GYPSUM



USG shaft wall manual

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development of shaft walls

When the need for elevator, stairwell and air shafts became apparent, shaft walls were designed using construction materials such as concrete block, tile and brick. These walls performed satisfactorily in most installations but were costly, added much extra weight to the building and required extensive materials handling. There were delays due to moisture of construction, trade conflicts, union restrictions, material deliveries and storage requirements.

In recent years, the trend toward taller buildings has accentuated the need for lower-cost, lightweight dry systems that can reduce material handling yet meet required fire and sound ratings. High-speed elevators needed for such buildings create greater pressures in the shafts which can weaken masonry structures. This impairment of the shaft structure can reduce its fire-protection effectiveness.

design criteria

Elevator shaft walls differ from conventional partitions in that many are "working walls" and must be capable of withstanding flexural stresses produced by continuous cycling under positive and negative air pressures.

In most instances, interior partitions need not be designed to withstand lateral loads greater than 5 psf. Shaft walls, however, must resist air pressures up to 15 psf created by high-speed elevator cabs moving in the shafts.

U.S.G. engineers measured shaft pressures to confirm design criteria for buildings such as Hancock Center, First National Bank and U.S.G. Corporate Headquarters in Chicago. These design requirements also applied to buildings with fewer stories but also using high-speed elevators. A system then had to be designed to withstand pressures that had literally blown concrete block from masonry shaft walls.

Other factors influence shaft wall design. Weight of the wall and its impact on structural steel requirements is a critical cost factor. Assembly should be fast and accomplished without need for excessive scaffolding. In addition, assembly of metal components and the hardness of some components must be such that continuous cycling of the wall through its allowable deflection does not produce "metal fatigue" and failure.

Local codes may consider shaft walls in the same class as standard interior partitions and allow deflections up to 1/120. U.S.G. recommends a maximum deflection limitation of 1/240 since shaft walls must withstand greater flexural movements resulting from elevator use. This criterion is not restrictive considering the fact that a deflection of 1/120 on a 12-ft. wall would result in a total lateral movement of over 2 in.

Extensive studies of these and other design elements by independent engineers, architects and U.S.G. Research specialists have established the following standards for good shaft wall design. The system must:

- 1)** Resist lateral loading of 7½ to 15-psf air pressure.
- 2)** Deflect not more than 1/240 of the partition height under design load.
- 3)** Not exceed 15 psf dead load.
- 4)** Provide at least 2-hr. fire rating.
- 5)** Offer min. STC rating of 38.
- 6)** Employ fasteners for panels that provide safe attachment through one million maximum-deflection cycles.
- 7)** Accommodate 16-ft. ceiling heights.
- 8)** Erect from one side only.
- 9)** Produce minimum waste and require minimum clean-up, particularly within the shaft.

why USG shaft wall?

United States Gypsum, after extensive research and testing, developed a dry shaft wall system to meet or exceed basic requirements.

These lightweight, non-load bearing gypsum drywall assemblies are ideal for enclosing elevator shafts, stairwells and other vertical shafts in multi-story buildings. Rapidly installed from outside the shaft, these systems provide shaft enclosures that may be finished later along with interior partitions.



USG Cavity Shaft Walls consist of USG Steel C-H Studs and J-Runners, USG Shaft Wall Liner Panels and SHEETROCK FIRECODE "C" Panels or IMPERIAL FIRECODE "C" Gypsum Base and Veneer Plaster. For maximum sound control, RC-1 SHEETROCK Resilient Channels are attached to steel studs, and double-layer gypsum panels are applied with THERMAFIBER Sound Attenuation Blankets installed in the cavity.

advantages

Shaft walls are used in office and institutional buildings, medium- and high-rise apartment complexes, and occasionally in industrial plants with high-risk separations. USG Shaft Walls have been specified in major construction projects throughout the U.S. because of their excellent design, code conformance and ease of installation.

Here are some specific advantages:

Engineered Performance—The systems have been designed and tested using accepted engineering practices with deflection criteria of 1/240 and 1/360 clear partition heights. A wide range of product and installation combinations is available to meet performance requirements: air pressure loading of 5, 7½, 10, and 15 psf; vertical heights to 15 ft. using 2½" studs, with greater heights available for lobbies and mechanical rooms using 4" studs. Stud design provides a vertical chaseway 1½" deep and 22½" wide for enclosing hangers, electrical conduit, etc.; also 1" dia. holes 16" from each end of stud for installation of horizontal conduit.

Fire Resistance—Ratings up to 4 hours.

Faster Completion, Earlier Occupancy—USG Shaft Walls erect easily using components and application procedures familiar to mechanics. System installs from each floor, leaving shaft free of scaffolding. Jobs move faster, schedules are more easily met and buildings can be finished and occupied sooner.

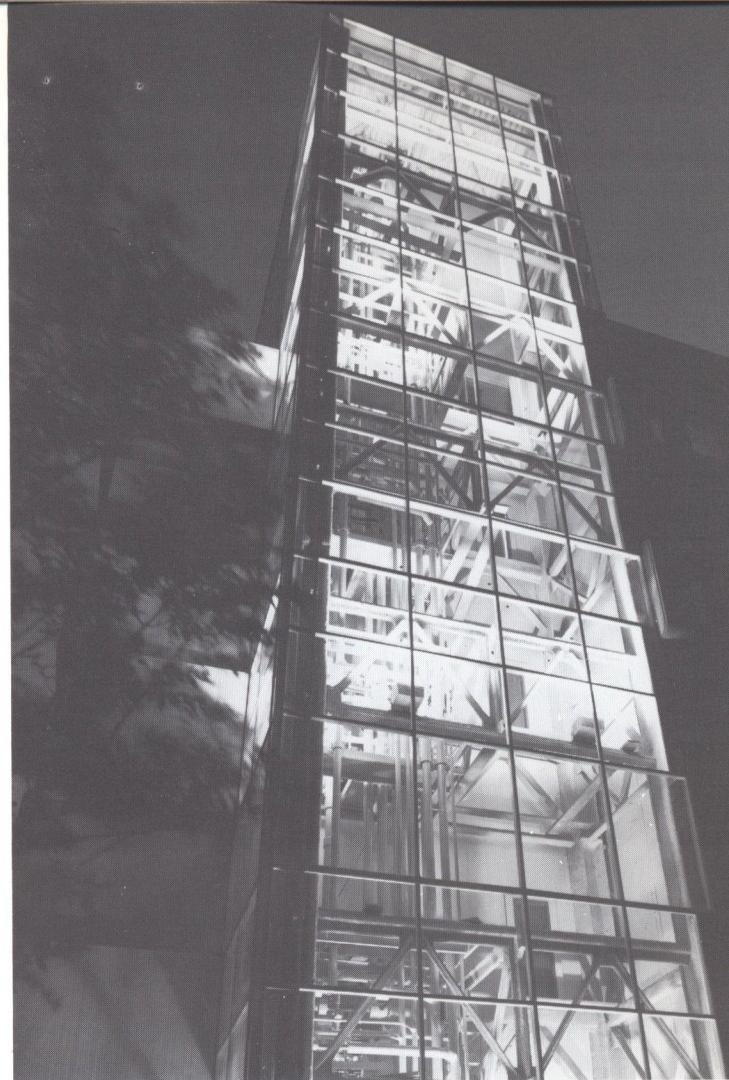
Economy—USG Shaft Walls utilize low-cost materials and a minimum number of components. The assemblies are lightweight, ranging from the exceptionally low 8 psf for the 1-hr. fire-rated design to 16 psf for the 4-hr. rated design. In high-rise buildings, USG Shaft Walls offer an opportunity for significant savings in structural framing costs and allow use of smaller foundations because of reduction in dead load.

Sound Control—The standard Shaft Wall assembly offers a 39 STC rating, 44 STC with 1" THERMAFIBER Sound Attenuation Blankets. The double-layer assembly with RC-1 Resilient Channels and 1½" Sound Attenuation Blankets has an STC rating of 51.

comparison with other systems

Design requirements of shaft walls result in particular advantages or disadvantages in various systems. The USG Shaft Wall System has proved to be one of the most practical and economical.

For example, in the two 110-story towers of New York's World Trade Building, there were 4 million sq. ft. of shaft walls. In masonry, these walls would have required 180 million lbs. of material to be delivered by truck, unloaded,

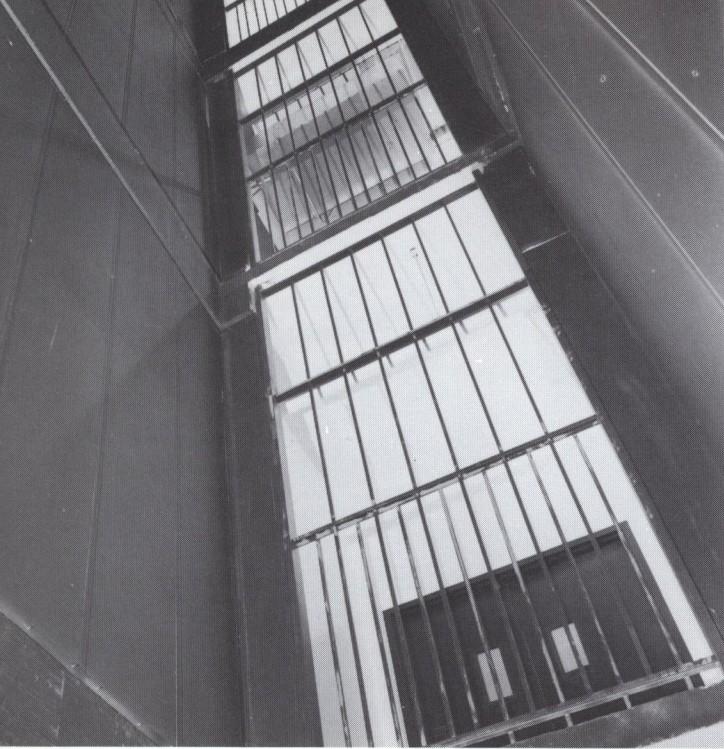


The versatile USG Shaft Wall System—used here with glass to enclose mechanical floors—reduced construction costs on project.

hoisted, handled and erected. The USG Shaft Wall System was installed with a total weight of 40 million lbs., a saving of 140 million lbs. More recent improvements in shaft wall design would have decreased this total weight by another 12 million lbs.

Here are some specific comparisons with other systems:

1. Less thickness and weight than masonry construction.
2. Simplicity of construction. Steel studs and liner panels are put in place with no mechanical fasteners. All work can be done from outside the shaft with only the face panels screw-attached.
3. No screw penetration into shaft with E-studs. Several systems have screws projecting as much as 5/8" to 3/4" inside the shaft which can present a safety problem.
4. Greater height versatility. Limiting heights to 28 ft.—more than other systems.
5. Air-leakage resistance to 50 psf—twice the established criteria.



Smoke shaft provides inside view of shaft wall construction.

6. No mechanical fasteners required with E-Studs—reduces flexing and eventual failure of runners and screws possible with competitive designs.
7. Withstands loadings of more than one million cycles with no failure of any components. Runners and screws in other designs failed at less than one million cycles.
8. Exceeds established fire-resistance requirements.
9. Possible sound ratings to 51 STC, highest of any shaft wall system.
10. Designed in full accordance with accepted engineering principles.

product standards

The products described and illustrated here are the basic materials recommended by United States Gypsum for shaft wall assemblies. For architectural details and specifications, see U.S.G. system folder SA-922 on Shaft Walls.

These materials are designed to meet the essential requirements of economy, speed of installation, strength, fire resistance and ease of decoration which are characteristic of quality drywall construction. They have been developed to achieve the optimum results based on extensive laboratory tests and job-proven performance. The United States Gypsum Company trademark is your assurance of proven product quality construction.

1. Gypsum Panels

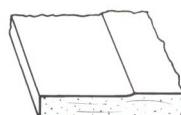
a. **USG Shaft Wall Liner Panels** have a special fire-resistant gypsum core encased in multilayered moisture-resistant green paper. Panels are placed vertically with ends inserted into steel J-Runners attached to floor and ceiling with edges inserted between supporting flanges of steel C-H Studs, E-Studs or J-Runners. Panels are attached with 1 $\frac{1}{8}$ " type S screws, 24" o.c. vertically when J-Runners are used in place of E-Studs. Panels have beveled edges, are 1" thick, 24" wide and are available in lengths to 16 ft. Weight is approx. 4 psf. Also used for surface application in the 4-hr. system.

b. **SHEETROCK FIRECODE "C" Panels** are gypsum panels with a specially formulated fire-resistant core for fire-rated construction. Ivory manila face paper is suitable for paint or other decoration. Face panels are placed vertically and screw-attached over horizontally applied base panels for triple- or double-layer application, or direct to studs for single-layer application. For these systems, panels are $\frac{1}{2}$ " or $\frac{5}{8}$ " thick, 48" wide and are available in lengths to 14 ft. Weight is approx. 2 psf for $\frac{1}{2}$ ", 2.5 psf for $\frac{5}{8}$ " panel thicknesses.

c. **IMPERIAL FIRECODE "C" Gypsum Base** is a special large-size gypsum lath with a high-strength, high-density core, designed especially for use with high-strength veneer finishes in fire-rated construction. It is faced with blue paper that provides optimum suction for the plaster. Panels are placed vertically and screw-attached over horizontally applied IMPERIAL Base for double- or triple-layer application or direct to studs for single-layer application. For these systems, panels are $\frac{1}{2}$ " or $\frac{5}{8}$ " thick, 48" wide and are available in lengths to 12 ft. Weight is approx. 2 psf for $\frac{1}{2}$ ", 2.5 psf for $\frac{5}{8}$ " thicknesses.



1" USG gypsum shaft wall liner



SHEETROCK gypsum panels



IMPERIAL gypsum base

2. Framing Members

Structural accessories for these systems are formed from hot-dipped galvanized steel meeting ASTM A446-67, Grade A with min. G60 zinc coating. Items are color-coded at the factory to indicate style as follows: 5—white, 7—green; 8—blue; 10—red. Obtain style designation from architect's specifications or drawings.

a. **USG Steel C-H Studs** are non-load bearing sections which are installed between abutting Shaft Wall Liner Panels. C-H Studs are available in 2 $\frac{1}{2}$ " and 4" widths, in lengths as required, with style-designation code printed every 24" for easy identification.

weight—lbs./MLF

style	2½"	4"
212CH5	604	—
212CH8	862	—
400CH5	—	716
400CH10	—	1,217

b. **USG Steel E-Studs** are non-load bearing E-shaped sections which are used at filler panels, door jambs, terminals, intersections and corners. E-Studs are available in 2½" and 4" widths, in lengths from 8 to 28 ft.

weight—lbs./MLF

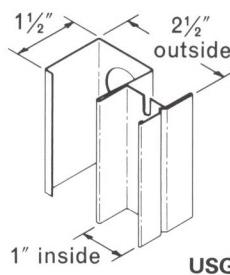
style	2½"	4"
212ES5	517	—
212ES10	807	—
400ES5	—	684
400ES10	—	1,067

c. **USG Steel J-Runners** are J-shaped sections used as floor and ceiling runners and as vertical members at elevator door jambs, terminals, intersections and corners. Also used to frame openings cut within a panel. Runners are 2½" and 4" wide; standard length is 10 ft.

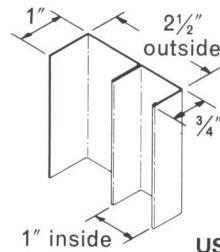
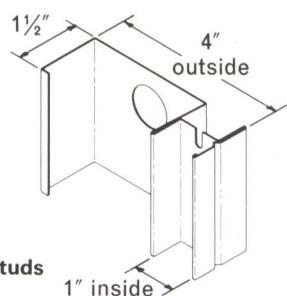
weight—lbs./MLF

style	2½"	4"
212JR7	525	—
400JR7	—	1,110

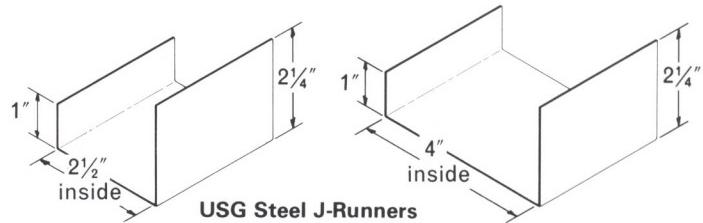
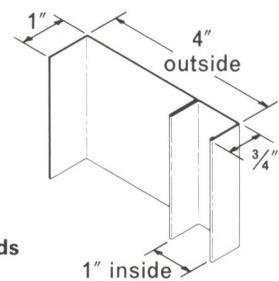
steel components—cavity shaft walls



USG Steel C-H Studs



USG Steel E-Studs



USG Steel J-Runners

3. Plastering Materials

a. Veneer Plaster and Finishes

- (1) IMPERIAL Finish Plaster—applied $\frac{1}{16}$ " to $\frac{3}{32}$ " thick single-coat system.
- (2) IMPERIAL Basecoat Plaster—applied $\frac{1}{16}$ " to $\frac{3}{32}$ " thick in two-coat system; select finish from (b) below.
- (3) DIAMOND Interior Finish—applied $\frac{1}{16}$ " thick in single-coat system.

b. Finish Plasters—applied $\frac{1}{16}$ " thick

- (1) IMPERIAL Finish Plaster.
- (2) STRUCTO-GAUGE Gauging Plaster and IVORY Lime (1:1 or 1:2).
- (3) RED TOP Keenes Cement and IVORY Lime (4:1 or 2:1).
- (4) DIAMOND Interior Finish.

4. Fasteners—USG Brand Screws

- a. 1", 1¼", 1⅝", 2¼" Type S, bugle head.
- b. ¾" Type S and S-12, pan head.

5. Insulation

THERMAFIBER Sound Attenuation Blankets are paperless, semi-rigid mineral fiber mats which are installed in stud cavities of USG Shaft Wall for substantially improved STC rating. For these systems, blankets are 1" or 1½" thick, 24" wide and 48" long.

THERMAFIBER Mineral Fireproofing is a noncombustible, semi-rigid felt used to provide a fast, clean, inexpensive method for protecting large steel columns and spandrel beams. Felt is 2" and 2½" thick, 24" wide and 48" or 60" long. Attached either with 12-ga. wire snap-on flange clips and 1½" diam. clinch shields or with $\frac{1}{8}$ " diam. cap-type steel studs welded through fireproofing.

6. Drywall Accessories

- a. Corner Bead—DUR-A-BEAD, No. 800.
- b. USG Metal Trim—Nos. 200A, 200B, 401, 402, 801A, 801B.
- c. USG Control Joint No. 093.
- d. USG Metal Furring Channel.
- e. RC-1 SHEETROCK Resilient Channel.

7. Lathing Accessories

- a. USG Control Joint No. 093.
- b. USG Corner Bead No. 800.
- c. USG Metal Trim No. 801A, 801B.

8. Joint Treatment

- a. PERF-A-TAPE Reinforcement.
- b. Joint Compound
 - (1) DURABOND Joint Compound—90, Taping, Topping, All Purpose.
 - (2) USG Joint Compound—Taping, Topping, All Purpose.
 - (3) USG Ready-To-Use Joint Compound—Taping, Topping, All Purpose.

9. Caulking Compound

USG Acoustical Sealant.

10. Materials by Other Manufacturers

Runner fasteners should be a power-driven type with ability to withstand 193 lbs. single shear and 200 lbs. bearing force when driven into structural head or base and without exceeding allowable stress in runner, fastener or structural support. Self-tapping $\frac{1}{2}$ " USG Brand Type S-12 Pan Head Screws may be used for runner attachment to a continuous metal fastening plate embedded in structural concrete. Suitable fastener types and sizes are shown in the following table:

runner track anchors

type	sizes—in.
Power-driven anchors For concrete For steel	5/32 diam., 1 $\frac{1}{4}$ long 5/32 diam., $\frac{1}{2}$ long
USG Brand Type S-12 Pan Head Screws	$\frac{1}{2}$ long
Threaded bolts and nuts	$\frac{3}{8}$ diam.

construction standards

Job Safety—Gypsum drywall construction is usually classified as nonhazardous; but since shaft walls are erected next to open vertical shafts using somewhat heavier materials, and may require work from within the shaft, certain precautions should be taken to prevent accidents. Consult local, state and federal regulations for details.

Materials Handling—In high-rise buildings, time and money savings can be substantial when proper materials handling methods are used. Contact your U.S.G. repre-

sentative for help in developing methods best suited to particular job conditions.

Job Storage—Shaft wall materials should be stored inside under cover and should remain in their wrappings or containers until ready for actual use. Gypsum panels should be stacked flat on a clean floor preferably near the location where they will be used.

Job Conditions—USG Shaft Wall Liner in shaft wall assemblies may be erected, as construction schedules require, and used as temporary shaft enclosures. Once erected, panels should be protected from exposure to moisture and the elements. If panels become wet, they must be allowed to dry thoroughly before face layers are applied or joints treated.

When the outdoor temperature is below 55° F., heat should be maintained in the building continuously and uniformly at not less than 55° F. from one week prior to beginning of joint treatment until gypsum panel application and joint treatment is completed. Joint treatment should not be started until windows are glazed and doors are installed unless openings are temporarily closed. Adequate ventilation should be provided to remove excess moisture during this period.

Advance Planning can mean savings in time and costs and point the way to the most effective use of materials. By looking ahead to the procedures used by other trades on the job, how they affect the installation of the shaft wall can be foreseen. The job superintendent should appraise the project early and, perhaps, suggest a meeting with the general contractor to coordinate the work sequence.

Special Situations—Certain shafts should not be enclosed until the mechanical work is completed and tested. Two or three walls can be erected to move the job along, but the other two walls will have to be completed later. Although USG Shaft Walls are primarily designed for installation from the slab side, some walls will require work from the scaffolding over or inside the shaft.

1. In toilet areas adjacent to the shaft it is advisable to install the gypsum panels ahead of the plumbing and return later to add the furred facing after the piping is in. If piping is installed before shaft wall goes up, mechanics may have to work from shaft side to erect the shaft wall, making the task more difficult and time-consuming.

2. To reach walls buried in the shaft, scaffolding is generally required. In this case, it is better to complete the entire shaft wall while crews are in the shaft. Usually, however, finish layers of board are installed and joints finished much later in the project.

3. Location of handrail support brackets should be determined so provision can be made for anchorage in the wall.

Similar consideration should be given to anchorage for toilet partitions on furred shaft walls.

4. Check door frame throat openings to be sure the shaft wall can be inserted; also check door frames for anchor clips for attachment of strut studs.

5. Bracket supports for pipes and ducts are normally located on top of the slab or beam. They should be located or held back to clear the runner track or coreboard panel.

Layout—Properly position shaft wall location according to the partition layout. Snap chalk lines at ceiling and floor. Be certain shaft wall will be plumb.

System Installation—The installation of major components of the systems is described and illustrated on the following pages together with recommended application procedure and limitations.

erection— USG cavity shaft wall system

Runner Tracks

Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and 24" o.c. With steel frame construction, install runners and E-studs on columns and beams before steel is fireproofed.

Steel Studs

Cut C-H Studs, E-Studs and J-Runners used vertically $\frac{3}{8}$ " to not more than $\frac{1}{2}$ " less than floor-to-ceiling height so as to engage short leg of J-Runner. Use E-Studs or J-Runners as vertical members over edge of liner board panels where shaft wall abuts columns, at T-intersections, corners and doors jambs. Install E-Studs over both long panel edges of closure panels and on abutting edges of both adjacent panels.

Shaft Wall Liner

Cut liner panels 1" less than floor-to-ceiling height to allow tilting into place when inserted into floor runners. With panel top held against back flange of ceiling runner, insert panel edge fully into E-Stud groove, tightly abutting the web. When J-Runners are used, attach liner to runner flange with $1\frac{5}{8}$ " screws spaced 24" o.c. Where shaft walls exceed 14 ft. in height, position liner panel end joints within the upper and lower third points of wall. Stagger joints top and bottom in adjacent panels to prevent a continuous horizontal joint.

Openings

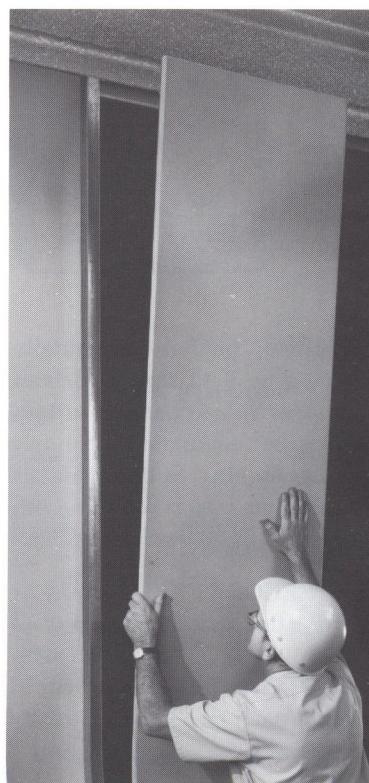
Use J-Runners to frame openings cut within liner panels. For openings up to 48" wide, frame with vertical E-Studs



Installing floor runner



Placement of studs



Placement of panels



Capping panel with stud

or J-Runners at edges, horizontal J-Runners of same gauge at head and sill. Attach vertical and horizontal J-Runners to web of studs with clip angles and $\frac{3}{8}$ " type S or S-12 screws as shown on drawings. Refer to architect's details for framing openings wider than 48".

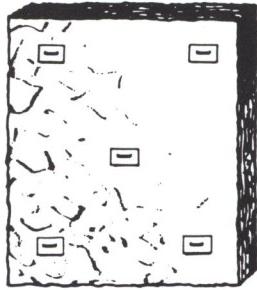
Hinged Door Frames

Install floor-to-ceiling-height 2½" or 4" E-Studs each side of steel hinged door frames and J-Runners or E-Studs each side of elevator door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with ¾" type S-12 pan head screws. Over metal doors, install a cut-to-length section of 2½" or 4" J-Runner and attach to adjacent studs with clip angles and ¾" type S-12 screws (see details, page 12).

Spot-grout all one-piece frames at quarter points after studs and liner panels are in place. Apply DURABOND or USG Ready-To-Use Joint Compound, sanded RED TOP Gypsum Plaster or STRUCTO-LITE Plaster just before inserting gypsum face panel into frame. Do not terminate panels against trim return. Refer to architect's details for additional strut-stud bracing at the strike jamb, which is recommended for hinged door frames and is required for heavy (over 50 lbs.) or oversize (more than 36" wide) doors.

Insulation

Install THERMAFIBER Sound Attenuation Blankets between studs of cavity shaft walls. Fit blankets carefully to fill entire height of stud cavity. Attach blankets to liner panels using ¼" divergent-point staples, driven through pieces of PERF-A-TAPE Reinforcement, placed at each corner and in the center of each blanket.



Gypsum Face Panels

1. Resilient—Attach RC-1 Resilient Channels horizontally to face of studs with ¾" type S or S-12 screws driven through holes in mounting flange. Space channels within 3" of floor and ceiling and max. 24" o.c. Extend channels to all corners and attach to corner framing. Splice channels by nesting directly over stud. Screw-attach through both flanges and reinforce with screws at both ends of splice.

Apply ½" SHEETROCK FIRECODE "C" Panels or IMPERIAL FIRECODE "C" Gypsum Base horizontally to resilient channels with end joints staggered. Fasten with 1" or 1¼" type S screws 12" o.c. (space fasteners to within 6" of, but not over, C-H Studs). Attach face layer vertically to channels with 1⅜" type S screws 12" o.c. Stagger joints.

2. Triple Layer—Erect base layer ½" SHEETROCK FIRECODE "C" Panels or IMPERIAL FIRECODE "C" Gypsum Base vertically to face of studs. Install mid-layer horizontally and face layer vertically with joints staggered. Attach base-layer panels to studs with 1" screws 24" o.c., mid-layer with 1⅜" screws o.c., and face layer with 2¼" screws 16" o.c. Also attach face panels to J-Runners with 2¼" screws 12" o.c.

3. Double Layer—Where only one side of the shaft wall

is to be finished (elevator and mechanical shafts, etc.) erect ½" SHEETROCK FIRECODE "C" Panels or IMPERIAL FIRECODE "C" Gypsum Base vertically over one side of studs. Fasten base-layer panels to studs with 1" type S screws spaced 24" o.c. at edges and in field.

Apply second layer of ½" panels vertically. Stagger edge joints in face layer from edge joints in base layer. Attach face-layer panels with 1⅓" type S screws staggered from those in the base, spaced 12" o.c. at edges and in field, and driven into the studs.

4. Single Layer—Where both sides of the shaft wall are to be finished, as in stairwells, erect ½" SHEETROCK FIRECODE "C" Panels or IMPERIAL FIRECODE "C" Gypsum Base vertically on both sides of studs. Stagger edge joints on opposite sides of wall and attach panels with 1" type S screws spaced max. 12" o.c. in the field and 12" along vertical abutting edges. Stagger screws on abutting edges.

Veneer Plaster

1. Single-Coat System—Apply IMPERIAL Finish Plaster or DIAMOND Interior Finish.

2. Two-Coat System—Apply IMPERIAL Basecoat Plaster, then apply finish coat of IMPERIAL Finish Plaster, STRUCTO-GAUGE Gauging and IVORY Lime, RED TOP Keenes Cement and IVORY Lime, or DIAMOND Interior Finish.

Accessories

1. Gypsum Panel Joints—Finish all face-layer joints and internal angles with DURABOND or USG Joint System applied according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

2. Gypsum Base Joints—Treat all gypsum base joints, internal corners, trim and corner bead with DURABOND Joint System applied according to manufacturer's directions. Allow to dry before finish plaster application.

3. Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with staples 9" o.c. on both flanges along entire length of bead or with clinching tool.

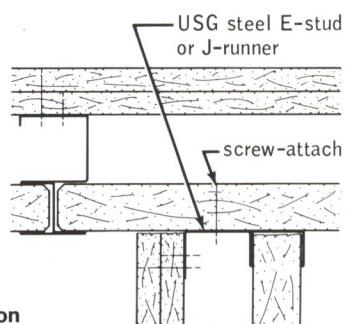
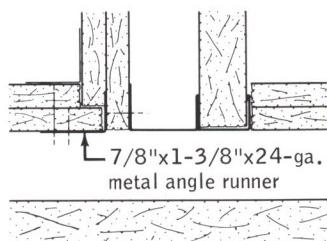
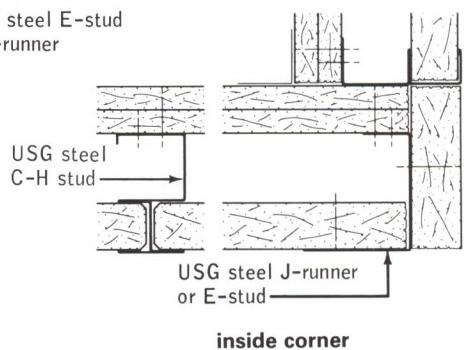
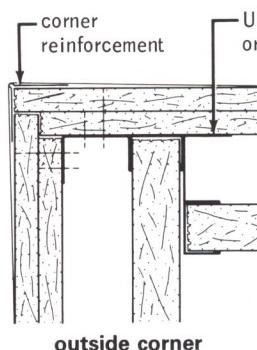
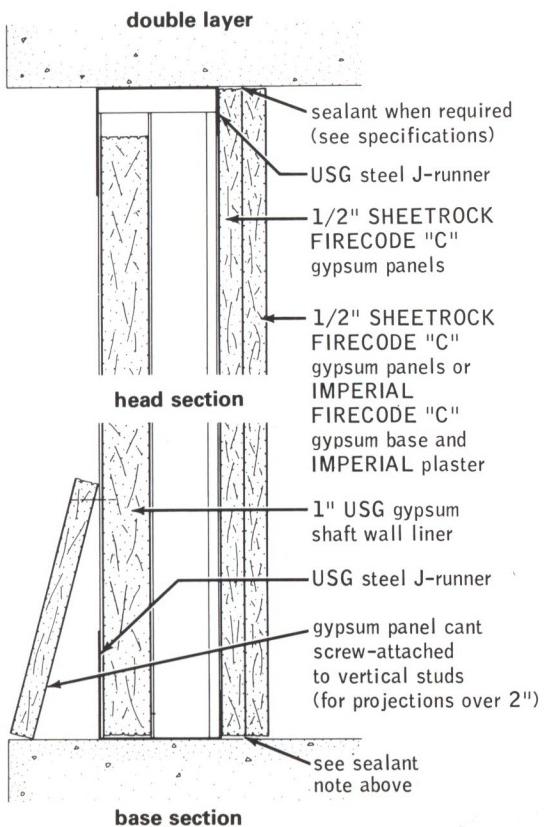
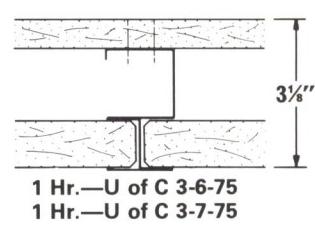
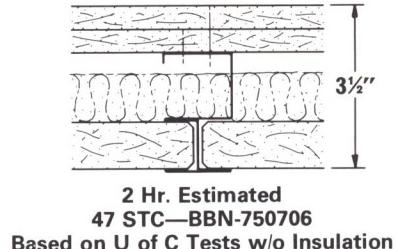
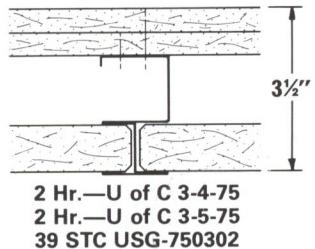
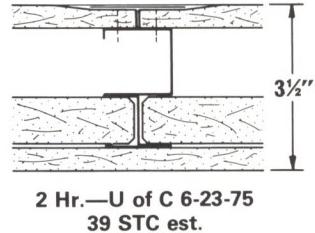
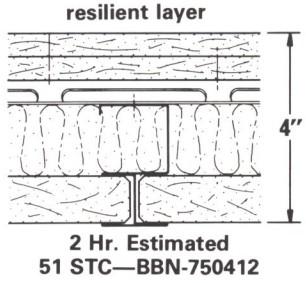
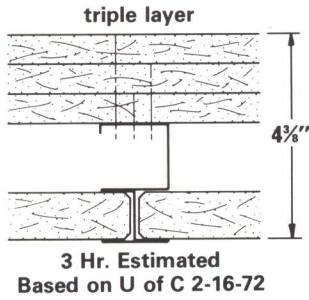
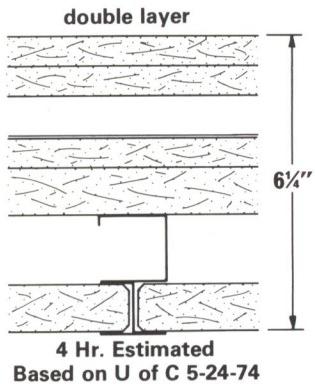
4. Metal Trim—Where shaft wall terminates against masonry or other dissimilar material, apply metal trim over face layer edge. Fasten with screws or staples spaced 12" o.c.

5. Screws—Power-drive at least ¾" from edges or ends of gypsum panels to provide uniform dimple ⅓" deep. In gypsum base, set head flush with surface of panel without tearing face paper.

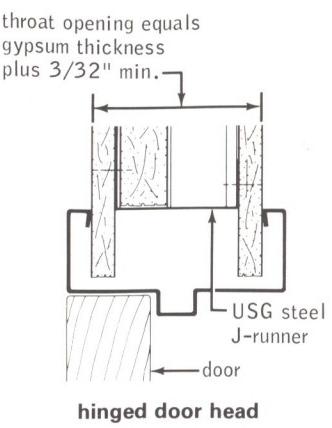
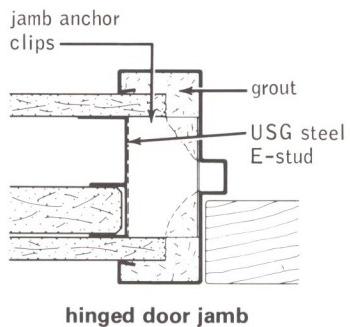
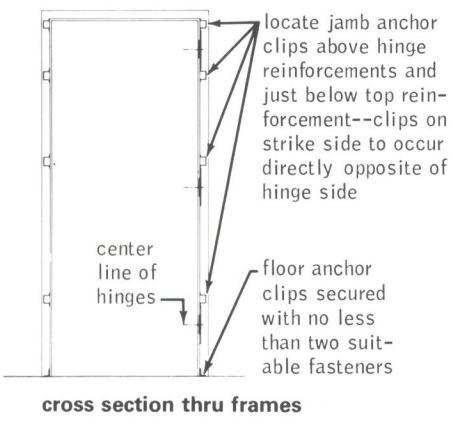
6. Control Joints—Break face layer behind joint. Attach control joint to face layer with staples spaced 6" o.c. on both flanges along entire length of joint.

7. Resilient Channels—Attach horizontally to face side of studs with $\frac{3}{8}$ " type S-12 screws through holes in mounting flange.

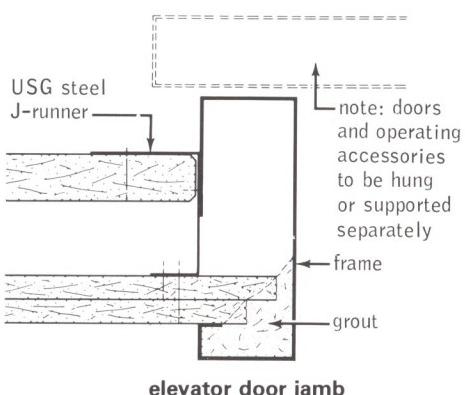
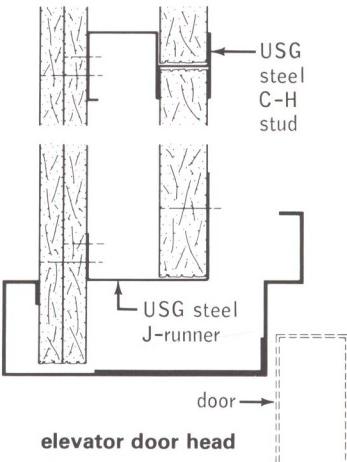
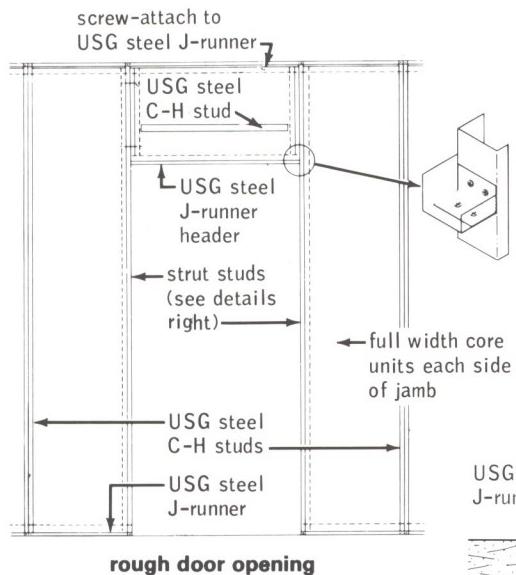
system details



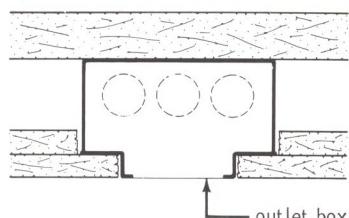
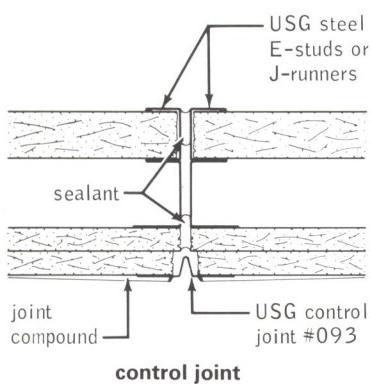
Hinged Doors



Elevator Doors



Miscellaneous Details



special applications

Electrical Fixtures

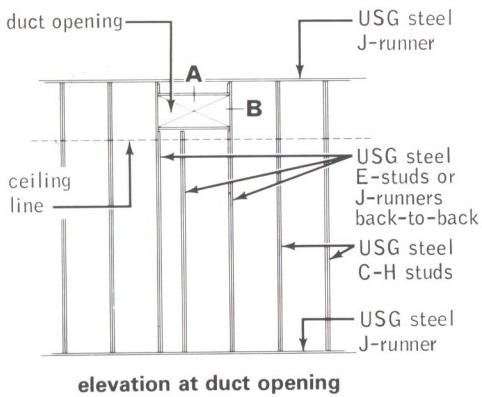
Work schedules should be coordinated to insure that electrical conduit and fixtures are installed after erection of studs and liner panels but before application of gypsum face panels. Install outlet boxes as detailed, page 12.

Duct Penetration

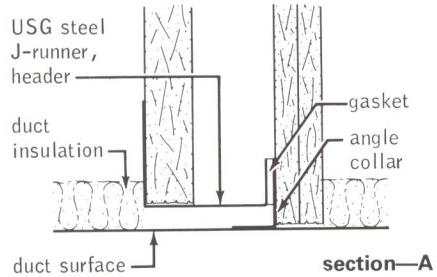
When panels are installed after ducts or duct stubs are in place, erect rough framing of floor-to-ceiling height E-Studs as strut-studs and J-Runner as header the same as for door frames. Install additional J-Runner to hold top of panels below duct.

When penetration for duct is cut after liner panels are installed, rough framing at header and sill must extend between nearest floor-to-ceiling height C-H or E-Studs. Cut J-Runners to fit between vertical studs and install header and sill to hold cut liner panels. Install panels with E-Studs at each vertical edge as filler panel on one or both sides of duct.

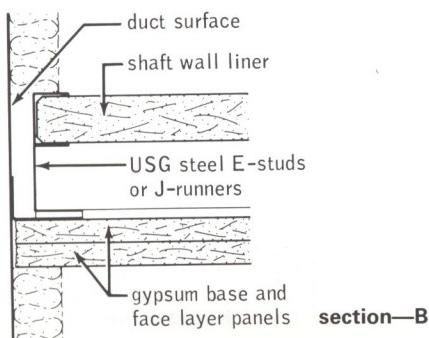
typical duct penetration



elevation at duct opening



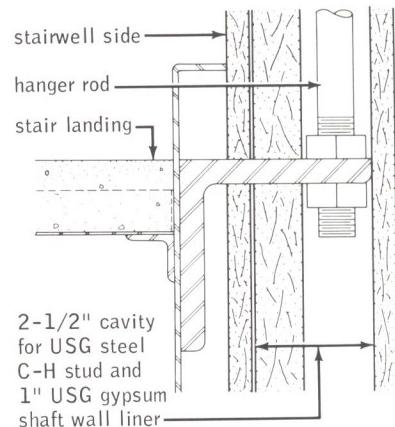
section—A



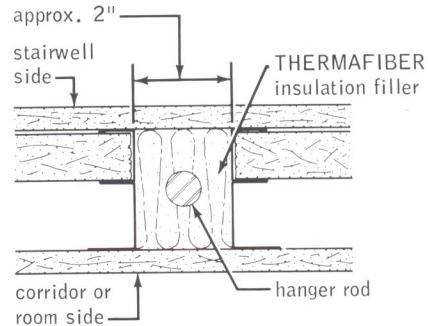
section—B

Stair Hanger

Install shaft walls so that stair hangers are concealed by the face layers. Allow about 2" vertical space between liner panels for hanger rod. Install vertical E-Studs or J-Runners over panel edges each side of opening. Stuff cavity with insulation. Back with gypsum panels on shaft side or install single-layer panels each side as required.



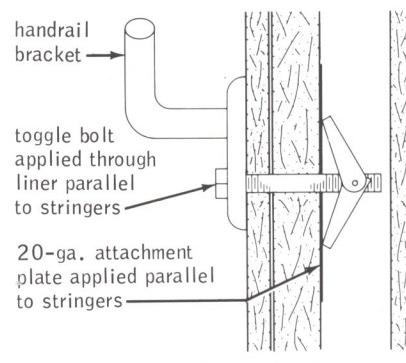
stair hanger rod application



cross section at stair hanger

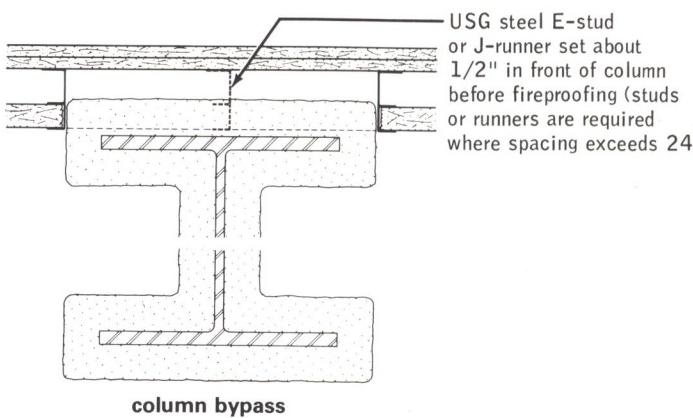
Handrail Brackets

Stairwells usually require additional gypsum panel facing as an interior finished surface. Because of this the location of brackets should be clearly specified to permit proper positioning of bracing and fasteners.



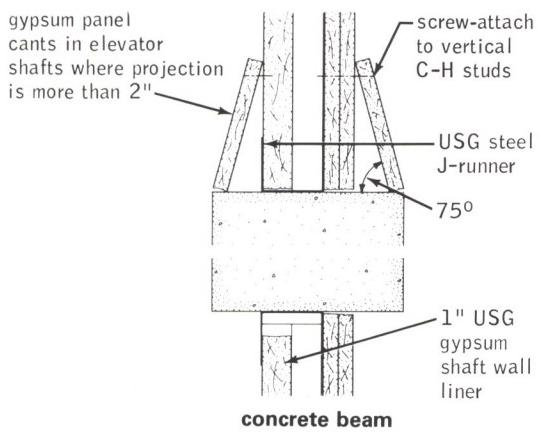
handrail application

Installation of handrail brackets using elevator bolts is preferred because it is stronger. Apply bolts with head behind liner panels and 20-ga. galvanized sheet metal reinforcing. As an alternate, bracket may be installed with 1 $\frac{5}{8}$ " Type S screws driven into studs or 20-ga. galvanized sheet metal insert placed between studs and parallel to stringers.



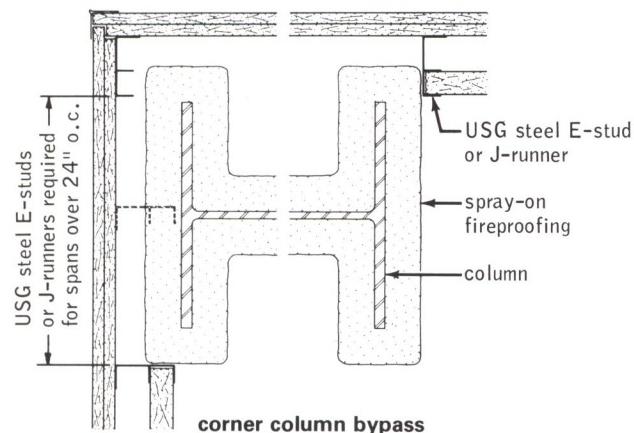
Elevator Shaft Cants

Cants are required in elevator shafts having horizontal projections of more than 2". Where specified, install strips of 1/2" gypsum panel at approximately a 75° angle and firmly screw-attach top of strips to C-H and E-Studs or vertical J-Runners used as studs.



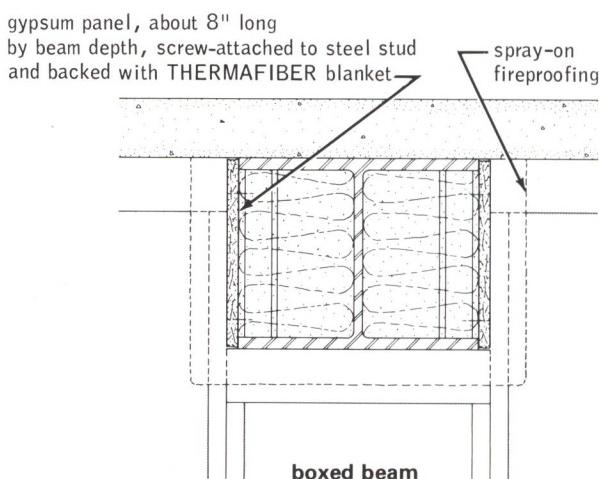
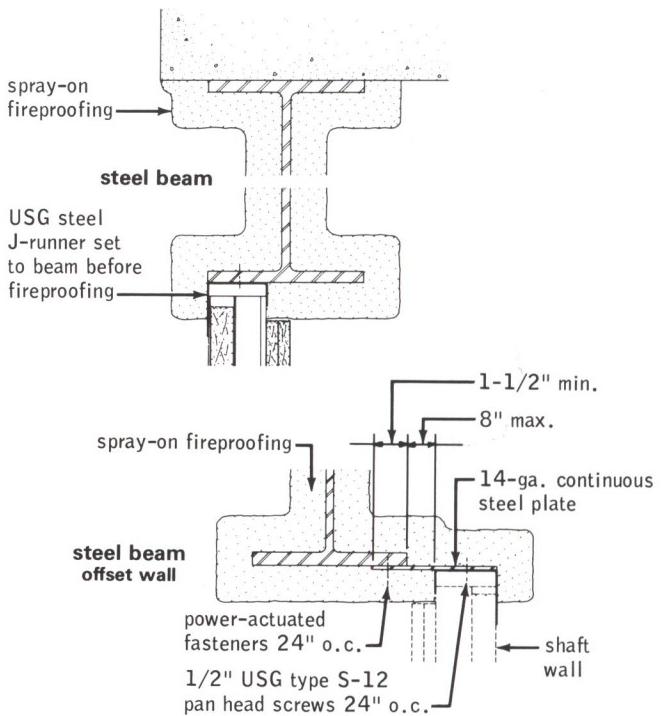
Framing Around Columns

Ideally the layout of the shaft wall should pass around column or the finished layers of SHEETROCK or IMPERIAL Base should pass by the columns. Structural elements should be fireproofed separately without relying on shaft walls to provide partial fireproofing. Isolate gypsum panel surfaces from all structural elements except the floor. Supports no greater than 24" o.c. should be provided for the panels. Do not rigidly attach panels to columns, beams, shear walls, etc.



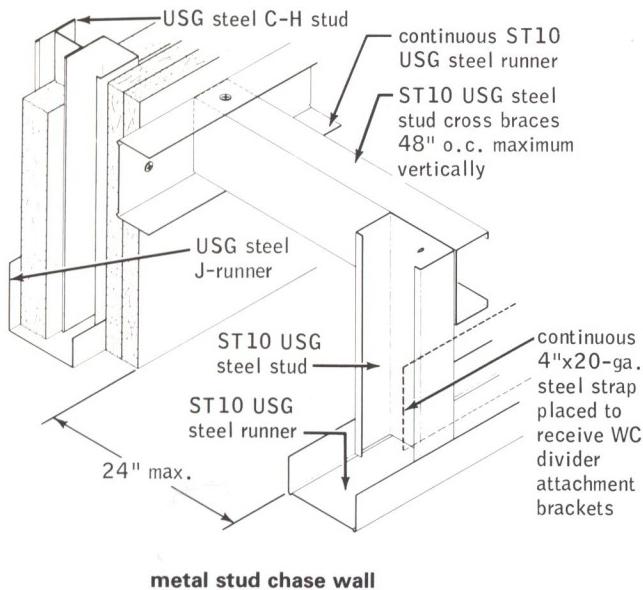
Framing Around Beams

Attach USG Steel J-Runners to beam, then apply spray-on fireproofing as required.



Chase Walls

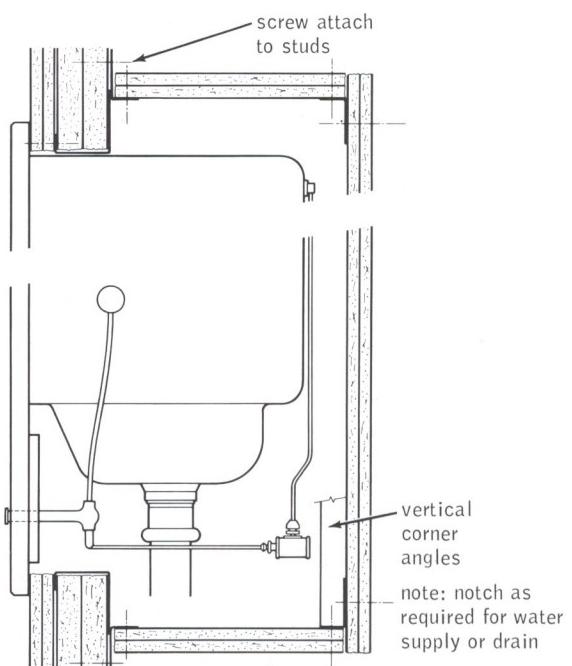
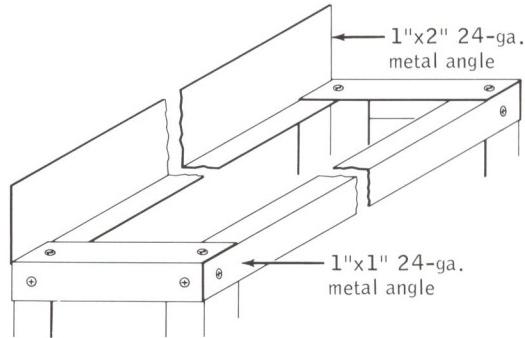
Plumbing chases are easily provided in toilet areas by installing a separate style-10 steel stud interior partition with gypsum panel facing one side. Install style-10 steel stud bracing to secure the studs to the shaft wall. Apply continuous 4"x20-ga. galvanized sheet metal strips over the studs for anchoring toilet partitions. Use SHEETROCK W/R (water-resistant) Panels as a base for ceramic, metal and plastic wall tile.



Water Fountains and Fire Hose Cabinets

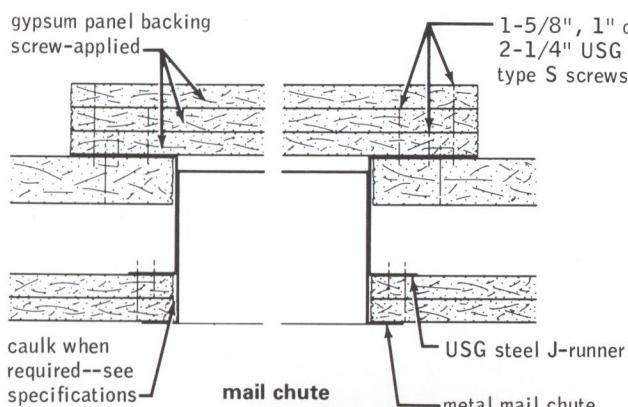
Chase walls are better suited for installation of water fountains and fire hose cabinets than shaft walls which usually require fire ratings. It is generally more economical to erect a separate chase wall, particularly if the run is short, than to provide additional fire protection from within the shaft for these items. Usually the architect accounts for this in his design.

If necessary to install these items in shaft walls, build a frame of angles to encase the item and add appropriate gypsum panel layers as fireproofing to the frame.



Mail Chute

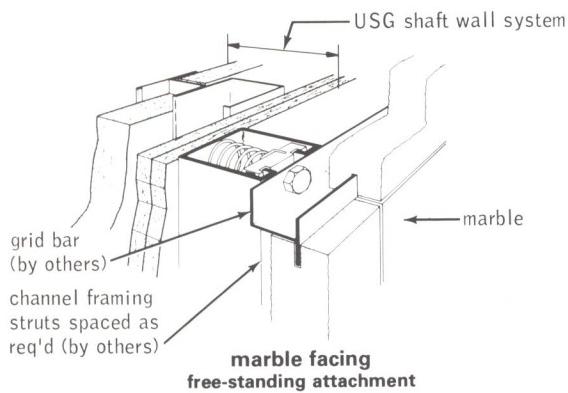
Install floor-to-ceiling-height J-Runners over liner panels on either side of mail chute opening. Apply gypsum panel strips from shaft side, screwing each layer securely into 2 1/4" J-Runner flange.



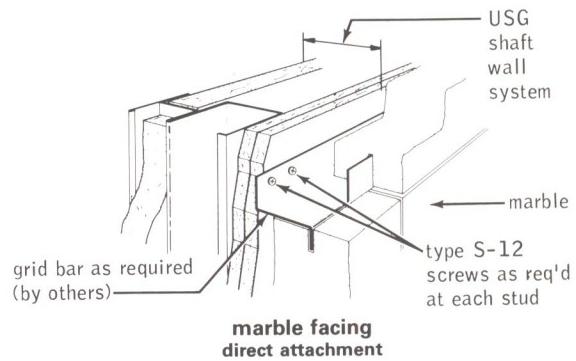
Marble Facing Attachment

Marble facings can be used in conjunction with the USG Cavity Shaft Wall. Weight of the marble must be supported on the structural floor or on separate structural framing—not on the shaft wall.

There are two methods for attaching face marble to shaft walls in lobbies, corridors, etc. For free-standing attachment, fasten channel framing struts to shaft wall, spacing as required. Position marble facing, fit grid bar into edge slot and bolt to channel framing strut.



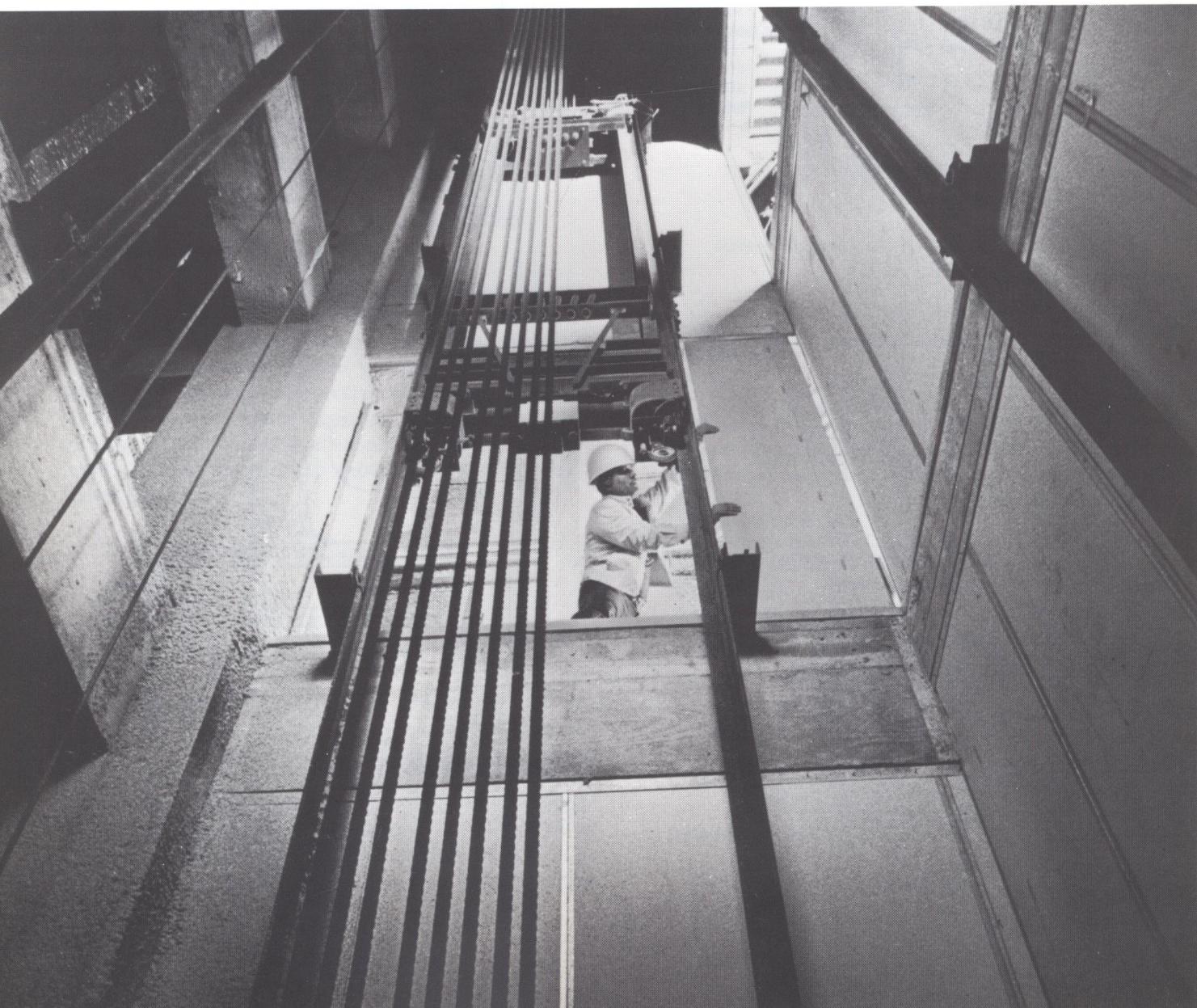
For direct attachment, position marble facing, fit grid bar into edge slot and attach grid bar to C-H Stud with Type S bugle head screws as required.



Caulking

Apply USG Acoustical Sealant around base layer in double-layer gypsum panel applications and around steel framing perimeter in single-layer applications. Apply enough acoustical sealant to prevent air leakage and dirt accumulation.

Elevator shafts go up fast in Standard Oil Co. (Ind.) headquarters building in Chicago.



physical test data

fire rating	description	test no.	stc rating (16-f)	comments
4 hrs. est.	Cavity Shaft Wall Gypsum Drywall—2 layers $\frac{5}{8}$ " SHEETROCK FIRECODE "C" gypsum panels face side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—1" liner panels & $\frac{5}{8}$ " gypsum panel core screw att to studs—horiz USG met fur chan 24" o.c.—face side panels screw att to fur chan—panels appl vert with joints stag—joints fin wt 16 width 6 $\frac{1}{4}$ "			Estimated fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
3 hrs. est.	Cavity Shaft Wall Gypsum Drywall—3 layers $\frac{5}{8}$ " SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels screw att to side opp liner panels with joints stag—base & face layers appl vert—mid layer appl horiz—joints fin wt 12 width 4 $\frac{3}{8}$ "		N/A	Estimated fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs. est.	Cavity Shaft Wall Gypsum Drywall—2 layers $\frac{1}{2}$ " SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—RC-1 chan spaced 24" o.c. $\frac{1}{2}$ " THERMAFIBER sound atten blks—panels & RC-1 chan screw att to side opp liner panels—base layer appl horiz—face layer appl vert—joints fin wt 10 width 4"	BBN-750412 (s)	51	Estimated fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs.	Cavity Shaft Wall Gypsum Drywall— $\frac{1}{2}$ " SHEETROCK FIRECODE "C" gypsum panels—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin wt 9 width 3 $\frac{1}{2}$ "	U of C 6-23-75 (f)	N/A	Construction fire tested both sides. Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs.	Cavity Shaft Wall Gypsum Drywall—2 layers $\frac{1}{2}$ " SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels appl vert to side opp liner panels & screw att—joints fin wt 9 width 3 $\frac{1}{2}$ "	U of C 3-4-75 (f) U of C 3-5-75 (f) BBN-750706 (s) USG750302 (s)	47 39	Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface. BBN-750706 based on same constr. with 1" blankets in cavity
1 hr.	Cavity Shaft Wall Gypsum Drywall— $\frac{5}{8}$ " SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels appl to side opp liner panels & screw att—joints fin wt 8 width 3 $\frac{1}{8}$ "	U of C 3-6-75 (f) U of C 3-7-75 (f)	N/A	Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface

design properties—steel components

stud size	designation	avg. weight (lb/lin ft)	I _x (in ⁴)	S _x * (in ³)	design stress (ksi)	end reaction (lb)
2 $\frac{1}{2}$ "	212CH5	.604	.146	.135	16.30	205
	212CH8	.862	.208	.185	19.96	422
4"	400CH5	.716	.433	.258	16.30	173
	400CH10	1.243	.730	.431	21.20	282
double 6" E-Stud	600ES5	1.546	2.004	.628	20.00	140
	600ES10	2.372	3.400	1.094	20.00	300

*Full section modulus to be used with corresponding design stress. For wind loads, design stress shown can be increased 33 $\frac{1}{3}$ %.

limiting heights—2 hr. fire-rated system⁽¹⁾

stud type & size	designation	stud spacing	allowable deflection	air pressure load—psf			
				5	7.5	10	15
2 $\frac{1}{2}$ " C-H Studs	212CH5	24"	1/120	14'0"(f)	11'3"(f)	10'0"(f)	8'0"(f)
			1/240	13'9"(d)	11'3"(f)	10'0"(f)	8'0"(f)
	212CH8	24"	1/360	12'0"(d)	10'6"(d)	9'6"(d)	8'0"(f)
			1/120	18'0"(f)	14'9"(f)	12'9"(f)	10'6"(f)
4" C-H Studs	400CH5	24"	1/240	15'0"(f)	13'0"(d)	11'9"(d)	10'3"(d)
			1/360	13'0"(d)	11'6"(d)	10'3"(d)	9'0"(d)
	400CH10	24"	1/120	22'9"(d)	20'0"(d)	18'3"(d)	15'9"(d)
			1/240	18'3"(d)	15'9"(d)	14'6"(d)	12'6"(d)
	600ES5	24"	1/360	15'9"(d)	13'9"(d)	12'6"(d)	11'0"(d)
			1/120	19'3"(f)	15'6"(f)	13'9"(f)	11'3"(f)
double 6" E-Studs	600ES10	24"	1/240	16'3"(d)	14'3"(d)	13'0"(d)	11'3"(f)
			1/360	14'3"(d)	12'6"(d)	11'3"(d)	9'9"(d)
		24"	1/120	28'0"(v)	18'9"(v)	14'0"(v)	9'3"(v)
			1/240	26'3"(d)	18'9"(v)	14'0"(v)	9'3"(v)
		24"	1/360	23'0"(d)	18'9"(v)	14'0"(v)	9'3"(v)
			1/120	28'0"(c)	28'0"(c)	28'0"(c)	20'0"(v)
		24"	1/240	28'0"(c)	26'3"(d)	24'0"(d)	20'0"(v)
			1/360	26'3"(d)	23'0"(d)	21'0"(d)	18'3"(d)

(1) For assembly with double-layer board one side of studs. Limiting criteria: f—bending stress d—deflection, v—end reaction shear, c—practical limitation. Runner attachment spacing should not exceed 24" o.c.

problems and remedies

1. Expansion and Contraction—Shaft wall surfaces should be isolated with control joints or other means where: **(a)** construction materials change within the plane of the shaft wall; **(b)** shaft wall run exceeds 50 ft. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.

2. Concentrated Stresses and Loads—Penetrations of the diaphragm, such as door frames and duct openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.

Where access panels or large duct penetrations occur in shafts having pressure loads, headers, sills and adjacent channels may require reinforcing to properly distribute these loads.

3. Air Noise—Where shaft walls enclose elevator and return air vents, sealant is recommended at intersections with floors, ceilings, columns, ducts, etc. to seal peripheries and penetrations and minimize whistling and dirt accumulations due to air movement.

4. Deflection—Selection of limiting heights should be based on allowable deflection as follows: **(a)** 1/240 for gypsum panel surfaces, IMPERIAL Plaster surfaces and areas to receive adhesively applied ceramic tile; **(b)** mechanically attached marble or heavy stone should support its own weight from the floor or be separately supported. While some building codes permit design using 1/120 deflection and 5 psf uniform load, this large deflection may cause failure of screws attaching gypsum panels to steel framing components.

5. Attachment Failure—Incorrect choice of type or length of fastener can result in failure of the attachment. USG Type S Screws are suitable for gypsum panel or gypsum base attachment to steel C-H and E-Studs and J-Runners. Type S-12 Screws should be used for all metal-to-metal attachment. Select screw length from table below:

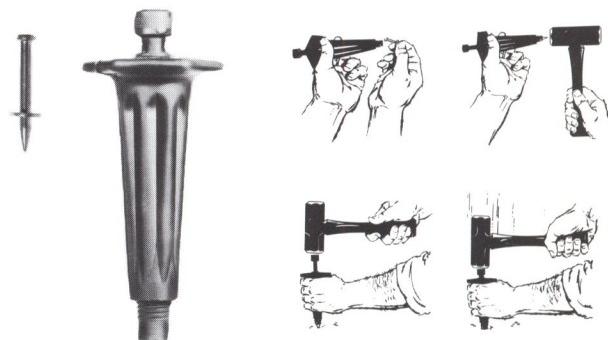
	1/2" thick panel	5/8" thick panel
single layer	1"	1"
double layer base layer face layer	1" 1-5/16"	1" 1 ⁵ / ₈ "
triple layer base layer mid layer face layer	1" 1-5/16" —	1" 1 ⁵ / ₈ " 2 ¹ / ₄ "

Screw length should be 2³/₈" for two 1" laminated liner panels, and at least 3/8" longer than the total thickness for other applications.

tools

The right tools suitably designed for a particular job can result in improved efficiency, man-hour savings and a high quality of workmanship. Major tools specifically required for USG Shaft Wall installation are described here.

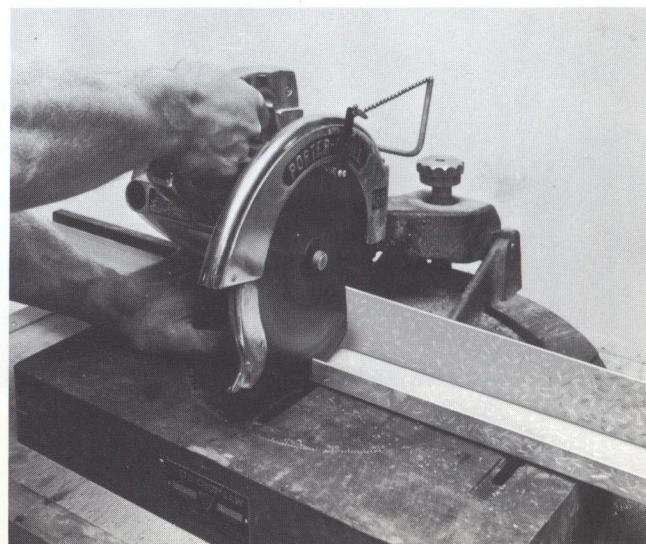
Shure-Set Tool R-375—A hand-operated tool that economically fastens steel J-Runners to concrete or steel with a few hammer strokes. A guide-washer holds fastener in tool then slides up shank as fastener penetrates. This washer provides extra support at penetration point and greater head-bearing area to resist pull-away of runner. Manufactured by Ramset; available at hardware stores.



Powder-Actuated Fastening Tool—Speeds the anchoring of steel J-Runners. Drive-in fasteners pierce and pin runner to steel or concrete in one operation. Available at powder-actuated tool suppliers.



Metal-Cutting Saws—Power tools speed cutting steel studs, runners and channels. They are most practical when floors are even and many studs or channels can be cut at one time. Several types are available: metal-cutting band saw, power hacksaw, electric saber saw or cutoff saw with a carborundum blade. Available at hardware stores and power tool suppliers.



Story Pole—Used to measure panel height when floors are relatively even. Fabricate locally from telescoping tubing, conduit or wood strips and adjustable device to secure lengths (pipe or hose clamp).

Power-Driven Screwdrivers—Electric power-driven screwdrivers, used to drive USG Type S and S-12 Screws to attach gypsum panels and metal framing.



NOTE: All products described here may not be available in all geographic markets. Full information about the many products and systems for construction manufactured by United States Gypsum Company is available from your U.S.G. sales office and representatives.

U.S.G. Construction Products Division Offices

Eastern

555 White Plains Road
Tarrytown, N.Y. 10591
(914) 332-0800

Southern

53 Perimeter Center—East
Atlanta, Ga. 30346
(404) 393-0770

Central

101 South Wacker Drive
Chicago, Ill. 60606
(312) 321-4000

Western

525 South Virgil Ave.
Los Angeles, Cal. 90020
(213) 388-1171



9 P
GYPSUM DRYWALL
UNITED STATES GYPSUM
1976-1



UNITED STATES GYPSUM

BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

partition applications

fire rating	description	test no.	stc rating		comments
			11-f	16-f	
1 hr.	Met Stud—1 layer $\frac{1}{2}$ " IMPERIAL FIRECODE "C" gypsum base & veneer plaster— $\frac{3}{8}$ " USG studs—base screw att— $\frac{1}{2}$ " THERMAFIBER sound attenu blnts stapled one side—joints stag & taped— $\frac{1}{16}$ " IMPERIAL plaster—perimeter caulked wt 8 width 4 $\frac{1}{4}$ "	T-3124-OSU CK-664-1	(f) (s)		Fire test based on assembly with 2 $\frac{1}{2}$ " studs, without blankets Stud spacing at 16" o.c. recommended
2 hrs.	Met Stud—2 layers $\frac{3}{8}$ " IMPERIAL FIRECODE gypsum base & veneer plaster— $\frac{1}{2}$ " or $\frac{3}{8}$ " USG studs 24" o.c.—base layer screw att—face layer lamin or screw att—joints taped— $\frac{1}{16}$ " IMPERIAL plaster wt 12 width 6 $\frac{1}{8}$ "	UL Des U411 TL-75-70 TL-75-73	(f) (s) (s)	45 51 47	Sound tests based on 2 $\frac{1}{2}$ " studs. TL-75-70 based on same constr. with 1 $\frac{1}{2}$ " THERMAFIBER blankets
2 hrs.	Met Stud—2 layers $\frac{1}{2}$ " IMPERIAL FIRECODE gypsum base & veneer plaster— $\frac{1}{2}$ " or $\frac{3}{8}$ " USG studs 24" o.c.—both layers appli vert, joints stag & screw att— $\frac{1}{16}$ " IMPERIAL plaster—perim caulked wt 10 width 4 $\frac{1}{4}$ "	UL Des U303 CK 654-66	(f) (s)		CK 654-66 based on assembly with 1" THERMAFIBER blankets
	Met Stud—2 layers $\frac{1}{2}$ " IMPERIAL FIRECODE "C" gypsum base & veneer plaster— $\frac{1}{2}$ " or $\frac{3}{8}$ " USG studs 24" o.c.— $\frac{1}{2}$ " THERMAFIBER sound attenu blnts stapled one side—base appli vert & joint stag—base layer screw att—face layer strip lamin or screw att—joints taped— $\frac{1}{16}$ " IMPERIAL plaster—perimeter caulked wt 10 width 4 $\frac{1}{4}$ "	UL Des U412 USG-127-FT-G&H Field Test KSO-1090072-a	(f) (s) (s)	52 48 49	Sound test based on strip-laminated face layer Field test includes 2 caulked outlets each side

ceiling applications

fire rating	description	test no.	sound rating		comments
			STC	IIC	
2 hrs. (beam 2 hrs.)	$\frac{1}{2}$ " IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling furred or susp—USG met fur chan—base att with screws 12" o.c.—joints taped— $\frac{1}{16}$ " IMPERIAL plaster— $\frac{1}{2}$ " conc on riblath or corrug stl clg wt 4	UL Des G515 (was 221-2 hr)	(f)	N/A	Spacing of furring channel at 16" o.c. recommended
3 hrs. (beam 3 hrs.)	$\frac{5}{8}$ " IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—USG met fur chan—base att with 1" Type S screws 12" o.c.—joints exp or taped— $\frac{1}{16}$ " IMPERIAL plaster— $\frac{3}{8}$ " conc on riblath over bar joist clg wt 4	UL Des G512 (was 82-3 hr)	(f)	N/A	Spacing of furring channel at 16" o.c. recommended

beam application

3 hrs. (beam only)	Gypsum Lath and Veneer Plaster Caged Beam Fireprfg— $\frac{1}{8}$ " USG stl run chan brackets 24" o.c.— $\frac{1}{8}$ " x $\frac{1}{8}$ " corner angles att to chan brackets—3 layers $\frac{5}{8}$ " IMPERIAL FIRECODE base att with Type S screws—1" 20-ga. hex mesh on bottom over middle layer—met beads on corners—joints taped— $\frac{1}{16}$ " IMPERIAL plaster— $\frac{1}{2}$ " conc deck on fluted stl flr	UL Des N505 (was 214-3 hr)	(f)		Fire rating for restrained assembly; 2-hr. rating for unrestrained assembly
			N/A		Extends veneer plaster use to beam protection

For wall furring applications, see page 8.

description

In the IMPERIAL Plaster Systems a thin veneer ($\frac{1}{16}$ " to $\frac{3}{32}$ " thick) of specially formulated, high-strength gypsum plaster is applied over IMPERIAL Gypsum Base. Either IMPERIAL Finish Plaster is applied in a single-coat system, or IMPERIAL Basecoat Plaster is used in a two-coat application as a superior base for IMPERIAL Finish Plaster, DIAMOND Interior Finish, STRUCTO-GAUGE Gauging Plaster and lime, or Keene's-lime-sand-float finish.

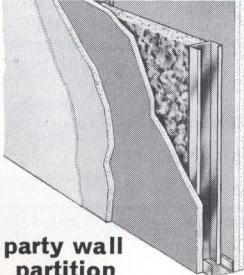
IMPERIAL Gypsum Base, 4 ft. wide, has a high-strength, high-density core, either regular, FIRECODE or FIRECODE "C" type, covered with special absorption face paper designed for veneer plastering. Versatile IMPERIAL Base, as outlined below, is used with steel or wood studs or metal furring channels to meet design requirements for interior partitions and ceilings; party, chase and shaft walls; furring and column fireproofing.

1. USG Steel Studs, available in 7 widths (see Specifications, page 10), set in steel runners, with 1-layer, $\frac{1}{2}$ " thick IMPERIAL FIRECODE "C" Base, screw-attached to $\frac{1}{2}$ " studs 16" o.c. This partition has a 1-hour fire rating, is suited for interior partitions and corridor walls. With double-layer $\frac{1}{2}$ " IMPERIAL FIRECODE "C" Base, attached by means of Type S screws to $\frac{1}{2}$ " or $\frac{3}{8}$ " studs spaced 24" o.c., a 2-hour fire rating plus

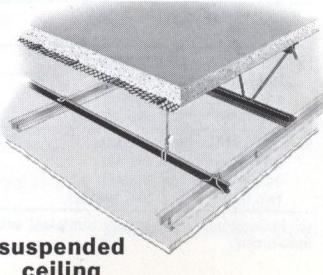
sound control suitable for party walls is available. Where added partition width is required, double rows of USG Steel Studs are erected to provide chase walls with up to 20 $\frac{1}{4}$ " net pipe chase width (see page 6). Up to 4-hour column fire protection is also available (see separate System Folder SA-923).

2. Metal Furring Channel—With Foil-Back IMPERIAL Gypsum Base screwed to USG Metal Furring Channels erected 16" o.c. direct to masonry or furred with brackets and $\frac{3}{4}$ " channels, this construction provides an excellent vapor barrier and offers

(continued on page 2)



party wall partition



suspended ceiling

description (continued from page 1)

significant insulating value as exterior wall furring (see page 8). A 3-hour fire-rated ceiling construction including beam protection is available with $\frac{5}{8}$ " IMPERIAL FIRECODE "C" Base screw-attached to furred or suspended USG Metal Furring Channels (see page 8). Z-Furring Channels are also used to mechanically attach THERMAFIBER Z-Furring Insulating Blankets to exterior walls. With $\frac{1}{2}$ " or $\frac{5}{8}$ " IMPERIAL Gypsum Base screw-attached to these channels, the assembly provides a fully insulated wall at a cost competitive with many non-insulated furred walls.

3. USG Steel C-H Studs—IMPERIAL Gypsum Base applied in one or two layers with gypsum coreboard and Steel C-H Studs provides systems with up to 3-hour fire ratings. These are ideally suited for enclosing elevator shafts, stairwells and other vertical shafts in core areas of multi-story buildings (see System Folder SA-922 for Shaft Wall applications.)

4. Wood Framing—IMPERIAL Base may be nail or screw-attached to wood framing where 1 or 2-hour fire protection is needed. With base screw-attached to resilient channels, sound ratings up to 53 STC are obtained. For details refer to U.S.G. System Folder SA-913, Veneer Plaster and Wood Framing.

5. PYROBAR Partition Tile—With IMPERIAL Base and Plaster applied, 4-hour column fire protection is available (see separate PYROBAR Tile System Folder SA-405).

function and utility

IMPERIAL Plaster Systems are designed for interior partitions and ceilings, exterior wall furring or wherever conventional plaster or drywall systems are used. The integrated components offer beautiful, hard surfaces ready for next-day decoration. IMPERIAL Plaster provides 3,000 psi compressive strength.

Durability—The high-strength, abrasion- and crack-resistant features of IMPERIAL Plaster offer the durability needed in high-traffic areas, and obtainable with few other materials.

Fire Resistance—Noncombustible components provide systems with fire-resistance ratings up to 3 hours (see table, page 1).

Sound Control—The systems offer sound isolation up to 53 STC; ideal for party walls.

Versatility—Adaptable to most dimensions or modules in virtually all types of buildings, these systems meet all normal design and job conditions.

Light Weight—The completed partition systems weigh appreciably less than masonry assemblies of the same thickness.

Economy—Simple, inexpensive components erect quickly at a lower cost than conventional plaster systems. Finish is rapidly applied by machine or hand application.

limitations

1. Non-load bearing.
2. These assemblies should not be used where exposed to abnormal moisture or excessive humidity or temperature.
3. Maximum frame spacing and limiting heights should not be exceeded (see tables below).

maximum frame spacing

lath and plaster assembly	steel studs or furring channels
$\frac{1}{2}$ " IMPERIAL Gypsum Base one layer, 1-coat plaster one layer, 2-coat plaster two layer, 1 & 2-coat plaster	16" 16" or 24" (1) 24"
$\frac{5}{8}$ " IMPERIAL Gypsum Base one layer, 1-coat plaster one layer, 2-coat plaster two layer, 1 & 2-coat plaster	16" or 24" (1) 24" 24"

(1) 24" spacing requires joint treatment with DURABOND Compound and PERF-A-TAPE Reinforcing.

limiting height—steel stud assemblies (1)

stud style	stud width	stud spacing	allow. defl.	partition, one layer	partition, two layers	furring, one layer
USG Steel Studs (ST5)						
158ST5	1 $\frac{1}{8}$ "	16"	1/240 1/360	10'0" d 8'9" d	11'3" f 9'9" d	8'6" d 7'6" d
		24"	1/240 1/360	8'9" d 7'6" d	9'3" f 8'6" d	—
20ST5	2"	16"	1/240 1/360	11'3" d 10'0" d	12'6" d 11'0" d	10'0" d 8'9" d
		24"	1/240 1/360	10'0" d 7'6" f	10'6" f 9'6" d	8'9" d 7'6" d
212ST5	2 $\frac{1}{2}$ "	16"	1/240 1/360	13'0" d 11'6" d	14'3" d 12'6" d	11'6" d 10'0" d
		24"	1/240 1/360	11'6" d 10'0" d	12'0" f 11'0" d	7'6" d —
30ST5	3"	16"	1/240 1/360	14'9" d 13'0" d	16'0" d 14'0" d	13'3" d 11'6" d
		24"	1/240 1/360	13'0" d 11'3" d	13'9" f 12'3" d	11'3" f 10'0" d
358ST5	3 $\frac{1}{8}$ "	16"	1/240 1/360	16'9" d 14'9" d	18'0" d 15'9" d	15'3" d 13'3" d
		24"	1/240 1/360	14'9" d 12'9" d	15'6" f 13'9" d	12'6" f 11'6" f
40ST5	4"	16"	1/240 1/360	18'0" d 15'9" d	19'3" d 16'9" d	16'3" f 14'3" d
		24"	1/240 1/360	15'9" d 13'9" d	16'6" f 14'9" d	13'3" f 12'6" d
60ST5	6"	16"	1/240 1/360	19'9" f 17'9" d	19'9" f 19'6" d	15'0" f 14'6" d
		24"	1/240 1/360	16'0" f 15'0" d	16'0" f 16'0" f	12'3" f 12'3" f

USG Steel Studs (ST10)

stud style	stud width	stud spacing	allow. defl.	one layer	two layers
20ST10	2"	16"	1/240 1/360	12'9" d 11'0" d	13'9" d 12'0" d
		24"	1/240 1/360	11'0" d 9'9" d	12'0" d 10'6" d
212ST10	2 $\frac{1}{2}$ "	16"	1/240 1/360	13'9" d 12'0" d	15'9" d 13'9" d
		24"	1/240 1/360	12'0" d 10'6" d	12'0" d 10'6" d
30ST10	3"	16"	1/240 1/360	16'9" d 11'6" d	17'9" d 15'6" d
		24"	1/240 1/360	14'6" d 10'0" d	15'6" d 13'6" d
358ST10	3 $\frac{1}{8}$ "	16"	1/240 1/360	18'3" d 16'0" d	20'0" d 17'6" d
		24"	1/240 1/360	16'0" d 14'0" d	17'6" d 15'3" d
40ST10	4"	16"	1/240 1/360	19'6" d 17'0" d	21'6" d 18'9" d
		24"	1/240 1/360	17'0" d 15'0" d	18'9" d 16'6" d
60ST10	6"	16"	1/240 1/360	21'9" d 19'0" d	25'6" d 22'3" d
		24"	1/240 1/360	19'0" d 16'9" d	22'3" d 19'6" d

(1) Limiting height for $\frac{1}{2}$ " or $\frac{5}{8}$ " thick base and 5 psf uniform load perpendicular to partition or furring. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

limiting height—chase wall partitions (1)

stud style	stud width	stud spacing	allow. defl.	one layer	two layers
158ST5	1 $\frac{1}{8}$ "	16"	1/240 1/360	13'3" d 11'6" d	15'9" f 15'9" f
		24"	1/240 1/360	11'6" d 10'3" d	13'0" f 13'0" f
212ST10	2 $\frac{1}{2}$ "	16"	1/240 1/360	19'6" d 17'0" d	25'0" d 21'9" d
		24"	1/240 1/360	17'0" d 14'9" d	21'9" d 19'0" d

(1) Limiting height for $\frac{1}{2}$ " or $\frac{5}{8}$ " thick base and 5 psf uniform load perpendicular to partition. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

technical data/components/details

IMPERIAL Plaster Systems

912

9.5/UC

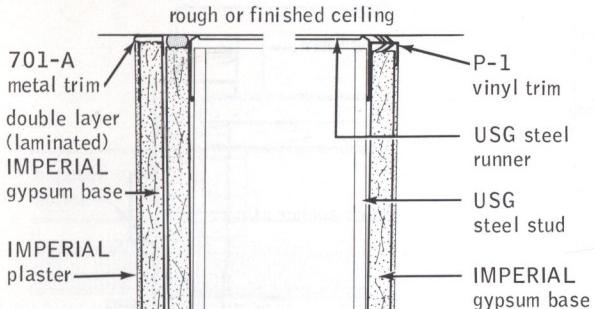
test no.	method	band center frequency - Hz																		STC			
		125	160	175	200	250	315	350	400	500	630	700	800	1000	1250	1400	1600	2000	2500	2800			
TL-75-70	Lab	31	39	—	42	45	49	—	51	53	53	—	54	55	55	—	52	47	48	—	51	54	51
CK-654-66	Lab	31	40	—	44	46	48	—	52	52	53	—	53	54	53	—	53	54	55	—	57	59	53
KSO-1090072-a	Field	26	29	—	37	39	45	—	48	48	49	—	52	54	55	—	52	52	53	—	55	56	49
USG-127FT-G&H	Lab	29	—	43	—	47	—	50	—	55	—	54	—	56	—	58	—	52	—	57	—	57	52
TL-75-73	Lab	27	31	—	34	39	41	—	44	47	49	—	52	54	54	—	49	44	47	—	51	54	47
CK-664-1	Lab	27	32	—	39	40	42	—	44	44	46	—	47	45	45	—	46	44	44	—	46	49	45

structural properties

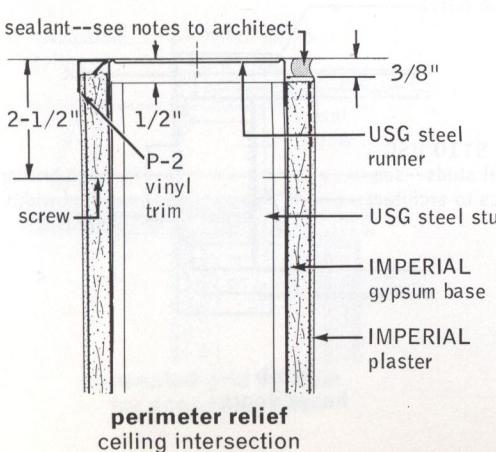
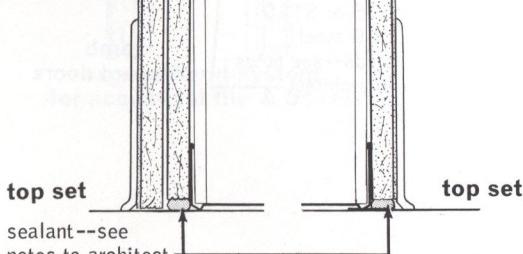
stud style	I in. x x	S in. x x	R in. x x
158ST5	0.043	0.047	0.689
20ST5	0.069	0.062	0.837
212ST5	0.115	0.082	1.028
30ST5	0.174	0.105	1.213
358ST5	0.269	0.135	1.304
40ST5	0.338	0.154	1.316
60ST5	0.324	0.146	1.481
20ST10	0.126	0.123	0.820
212ST10	0.210	0.164	1.012
30ST10	0.320	0.209	1.197
358ST10	0.497	0.269	1.422
40ST10	0.626	0.307	1.553
60ST10	0.864	0.396	2.076

steel stud partitions

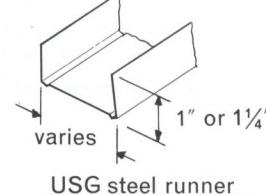
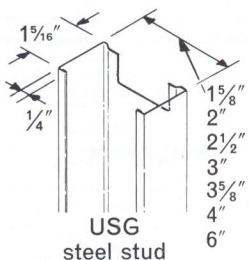
ceiling attachment



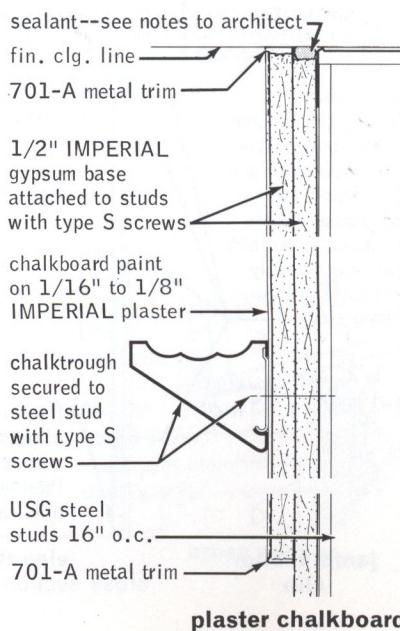
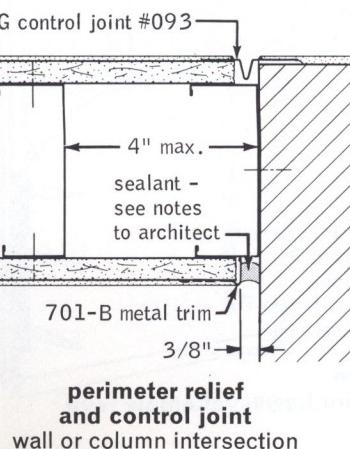
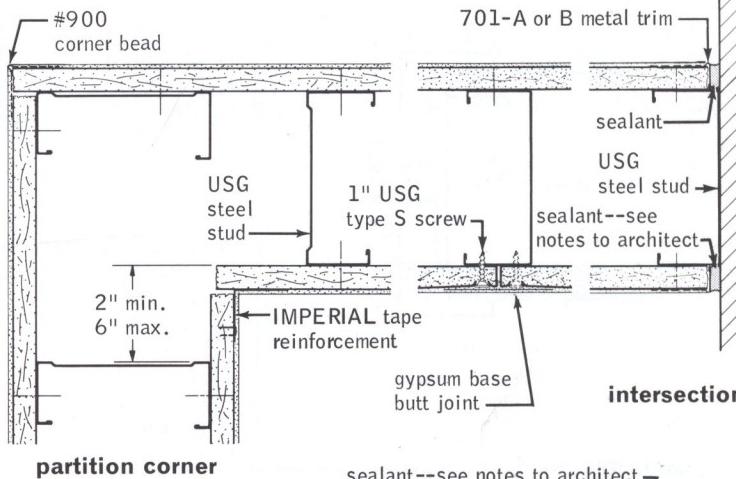
floor attachment



see gypsum plaster, bases & accessories catalog for full description of components



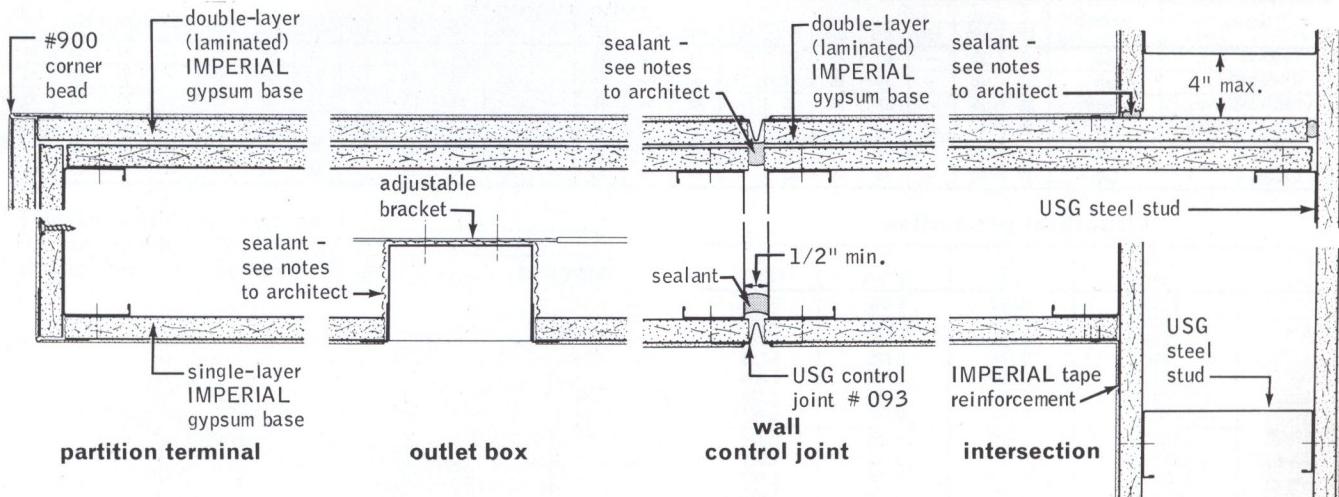
wall plan sections



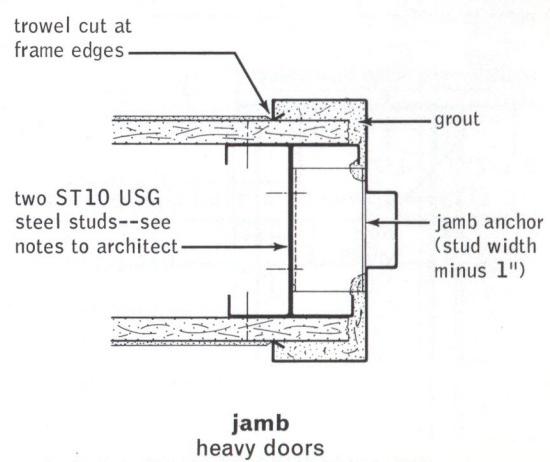
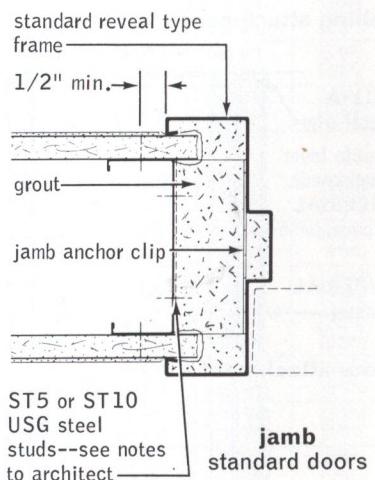
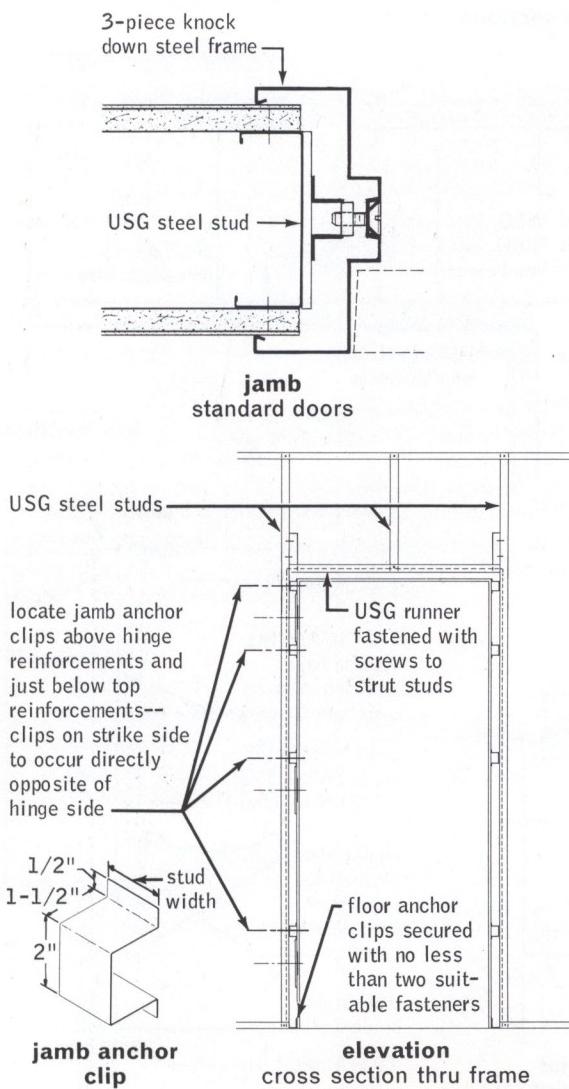
details/steel stud assembly

scale: 3" = 1'-0"

wall plan sections

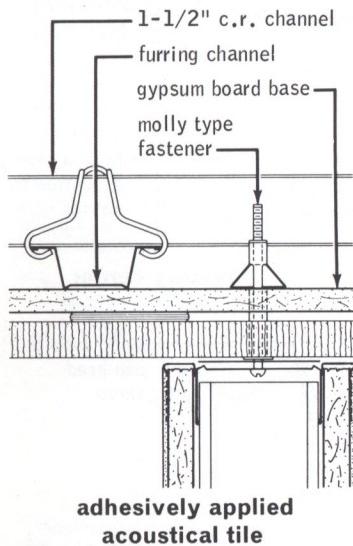


door frames

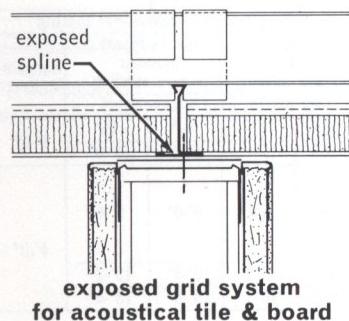


details/steel stud assembly

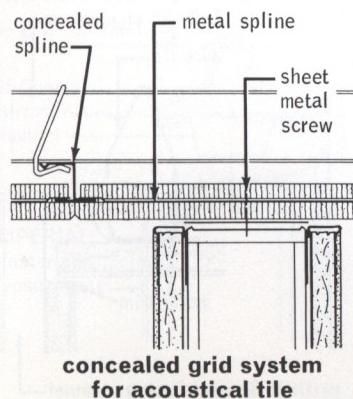
attachment of partition to ceiling



adhesively applied
acoustical tile



exposed grid system
for acoustical tile & board

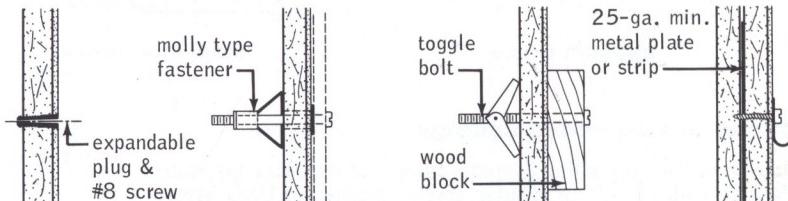


concealed grid system
for acoustical tile

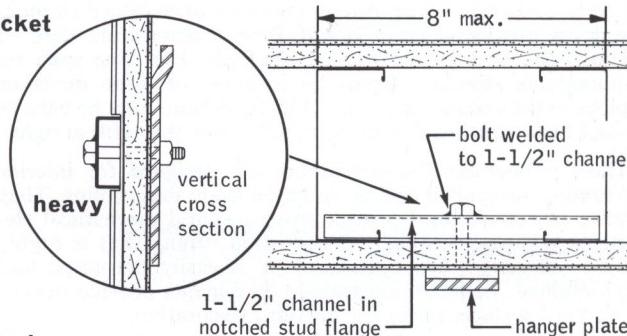
fixture attachment load table

type fastener or attachment	allowable withdrawal resistance—lbs.	allowable shear resistance—lbs.
fiber or plastic plug	#6 screw	10
	#8 screw	15
	#10 screw	20
	#12 screw	30
	#14 screw	30
toggle or molly	1/8" bolt	20
	3/16" bolt	30
	1/4" bolt	40
no. 8 sheet metal screw into 25-ga. metal sheet	50	100
type fastener or attachment	allowable static load—lbs.	allowable impact load—lbs.
plumbers bracket attached with 5/16" bolts and 1 1/2" channels	350	75
type fastener or attachment	uniform load—lbs. per bracket	uniform load—lbs. per lin. ft.
angle brackets (24" o.c.)	100	50
slotted standards (24" o.c.) light (.063" thick) medium (.082" thick) heavy (.094" thick)	40	20
	100	50
	150	75

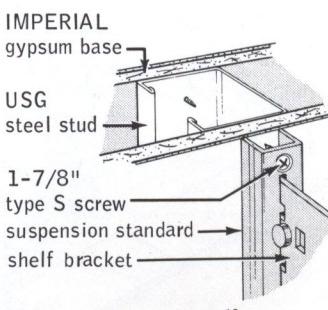
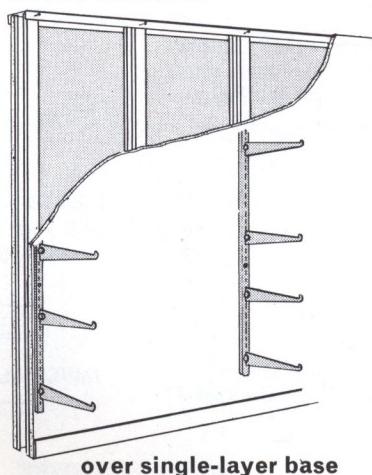
fixture attachments—light



plumbers bracket



slotted standards



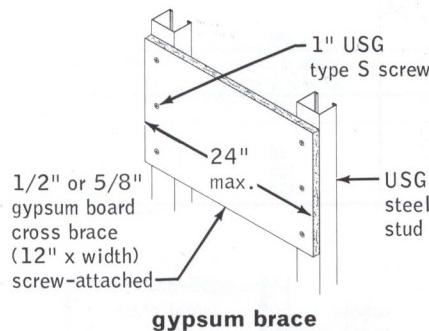
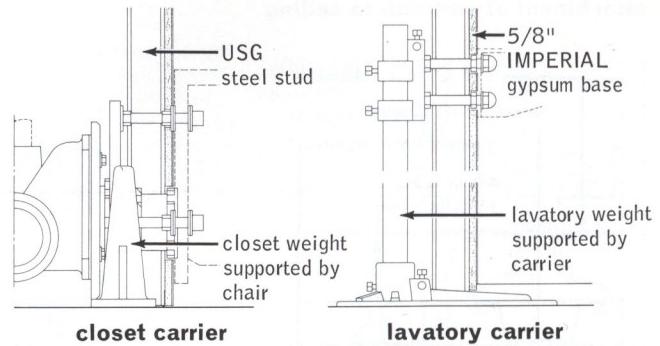
cross section

details

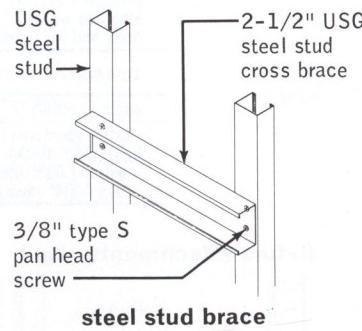
chase walls

Chase walls, as vertical shafts encasing the usual plumbing supply and wastelines, vent ducts and electrical conduits, require more free space than can be provided within the usual partition assembly.

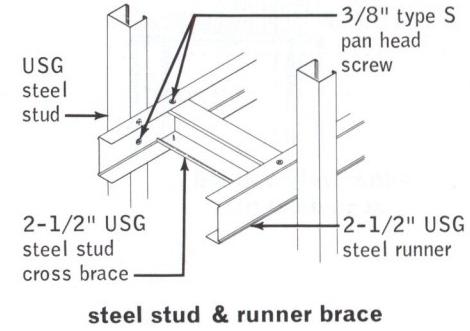
The metal stud chase wall may be formed of two USG Steel Studs bracketed together with 12" x chase width braces of $\frac{1}{2}$ " or $\frac{5}{8}$ " IMPERIAL Gypsum Base. As an alternate, 2 $\frac{1}{2}$ " steel stud cross braces screw-attached to chase wall studs may be used. When chase wall studs are not directly opposite, steel stud cross braces 24" o.c. are securely anchored to a continuous horizontal 2 $\frac{1}{2}$ " runner screw-attached to chase wall studs within the cavity. Limiting height for this chase wall is shown on page 2; vertical brace spacing 48" o.c. max.



gypsum brace



steel stud brace



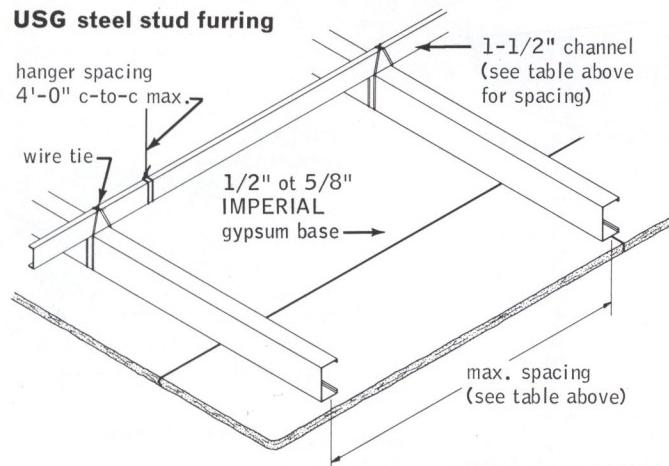
steel stud & runner brace

furred or suspended ceilings

IMPERIAL Plaster Ceiling Systems consist of IMPERIAL Gypsum Base, FIRECODE "C" or regular, screw-attached to USG Metal Furring Channels. These channels are firmly clipped or wire-tied to suspended main runner channels or wire-tied to main support members. USG Brand Type S Screws are used to attach the base to the furring channels. For long span requirements resulting from the location of large ducts or pipes in the ceiling space, the USG Steel Stud may be used as a ceiling furring member in this construction (see table at right).

These noncombustible assemblies are designed for interior furred or suspended ceilings or caged beam fireproofing. They serve to conceal and protect structural and mechanical elements with a lightweight fire-resistant ceiling that is highly light reflective when unfinished or is easily decorated and maintained. Perfectly integrated components provide beautiful, hard surfaces ready for next-day decoration.

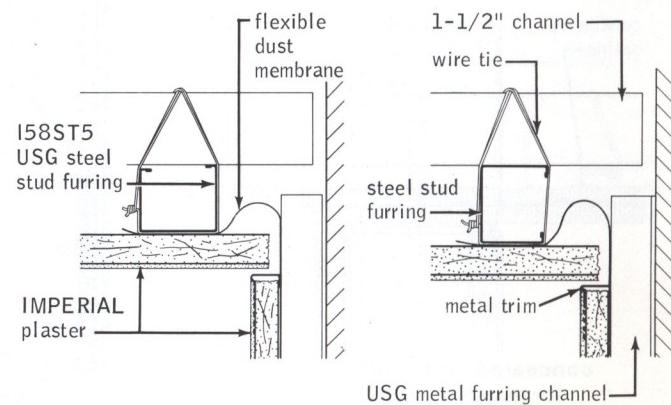
USG steel stud furring

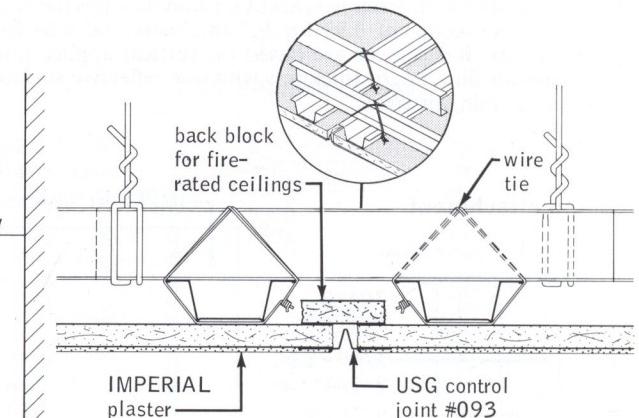
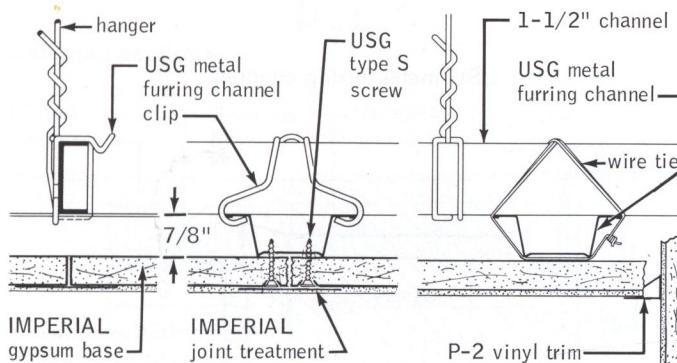
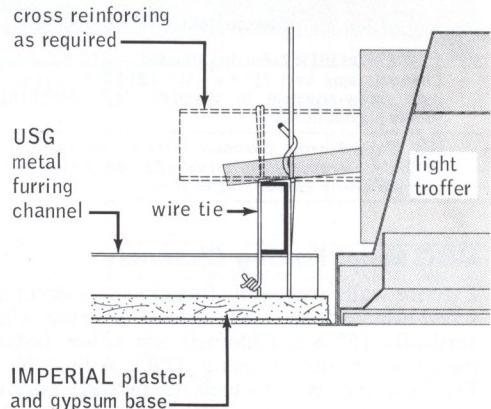
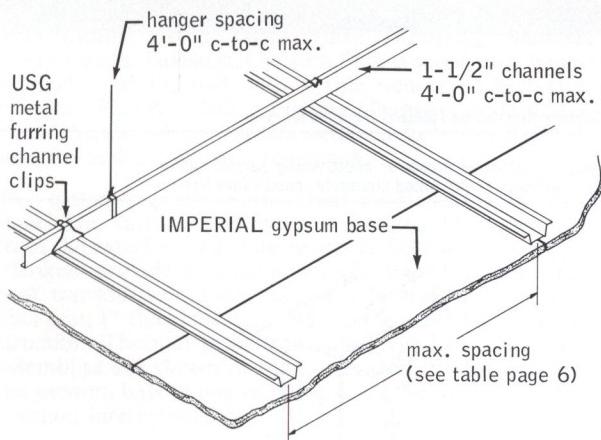
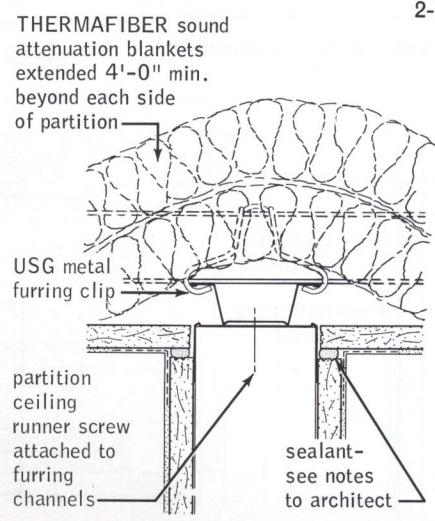
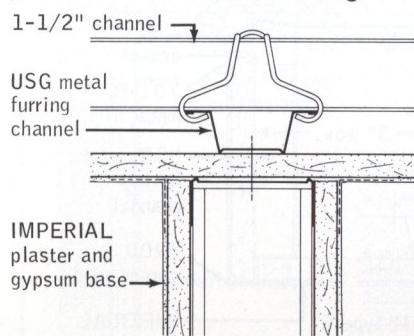


component spacing

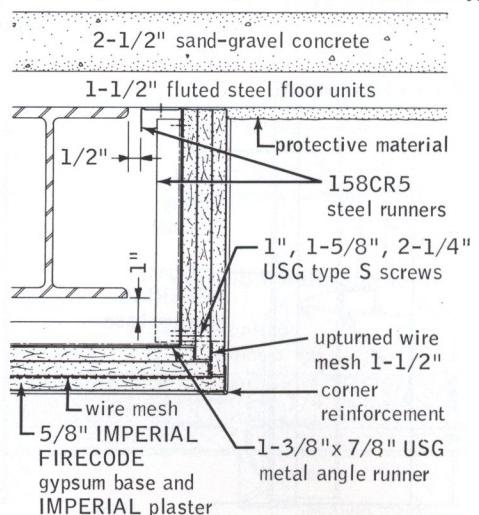
type furring member	ceiling systems—component spacing			
	furring member c. to c. spacing		main support member c. to c. spacing	hangers c. to c.
	for plaster base thickness of:			
USG Metal Furring Channel	$\frac{1}{2}$ " 16"	$\frac{5}{8}$ " 16" [†]	$\frac{1}{2}$ " 4'-0"	$\frac{5}{8}$ " 4'-0"
USG Steel Stud	1 $\frac{1}{2}$ " erected with both flanges up and against main support member	16"	16" [†]	5'-0"
	2 $\frac{1}{2}$ "	16"	16" [†]	10'-3"
	3 $\frac{1}{2}$ "	16"	16" [†]	13'-6"

[†]24" spacing may be used with 2-coat plastering.



USG metal furring channel**partition attachment at ceiling****continuous ceiling****interrupted ceiling**

beam protection (beam only)
3-hr. UL design no. N505 (restrained assembly)
2-hr. UL design no. N505 (unrestrained assembly)



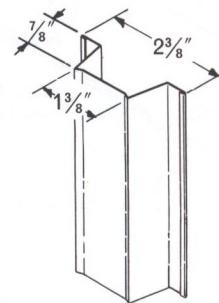
exterior wall furring/metal channels

description	comments
1" THERMAFIBER Z-Furring Blankets—USG Z-Furring Channels appl vert 24" o.c.—½" IMPERIAL gypsum base screw-attached to channels, ¼" IMPERIAL veneer plaster finish	Surface membrane isolated from masonry
USG Metal Furring Channels 16" o.c., ½" Foil-Back IMPERIAL gypsum base screw-attached to channels, ¼" IMPERIAL veneer plaster finish	May be attached direct or additionally furred out on ¾" horizontal cold-rolled channels; good vapor barrier

USG Metal Furring Channels

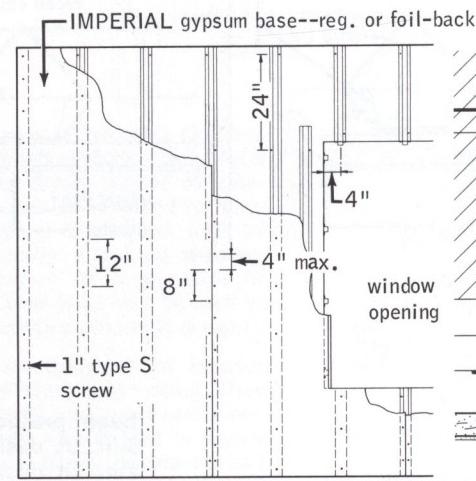
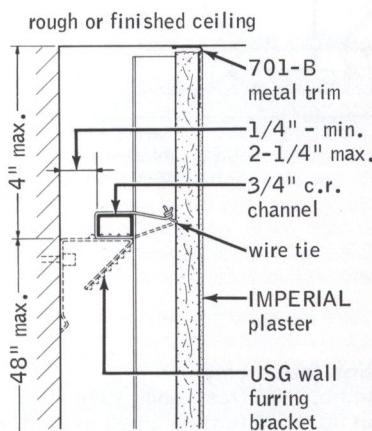
Exterior walls are readily furred using IMPERIAL Gypsum Base screw-attached to USG Metal Furring Channels erected vertically 16" o.c. Channels are either fastened directly to masonry or furred using USG Adjustable Wall Furring Brackets and ¾" channels to provide additional space for pipes, conduits or ducts. With the Adjustable Wall Furring Bracket, the limiting height is 12'.

In this assembly, Foil-Back IMPERIAL Gypsum Base has thermal resistance (R) values of 3.93 for ½" thickness and 4.04 for ¾" thickness. Resistances are based on vertical application, inside still air film, board thickness with one reflective surface facing a ¾" min. air space.

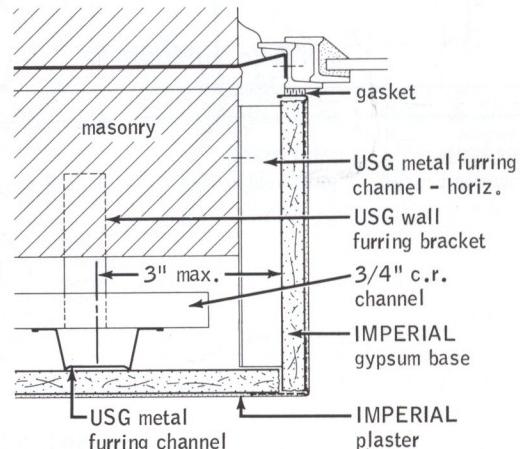


USG metal furring channel

ceiling attachment

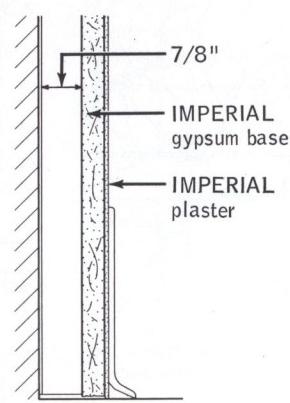
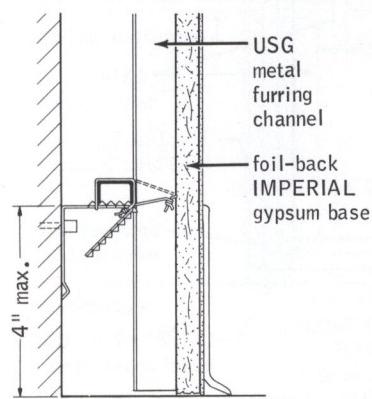


elevation—vertical application

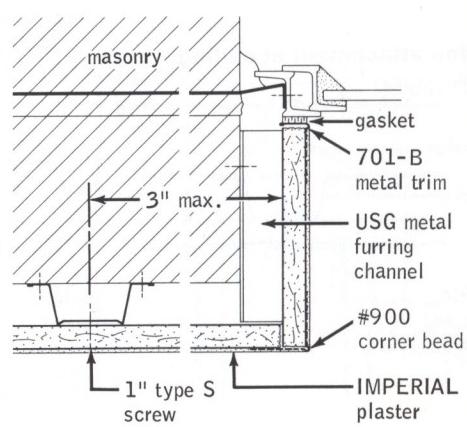


metal window jamb

floor attachment



top set



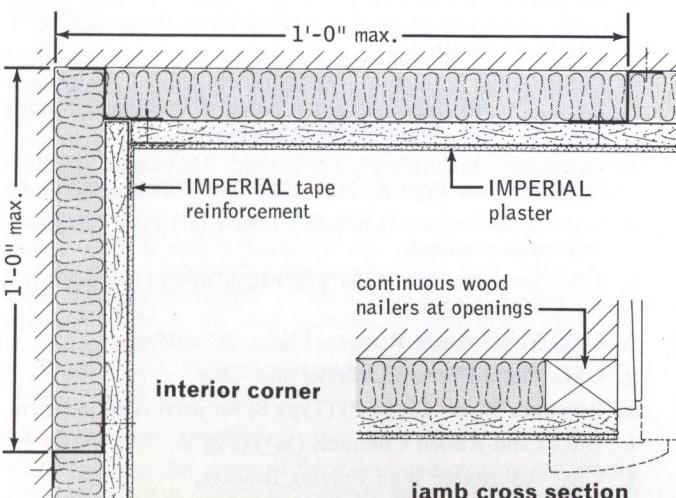
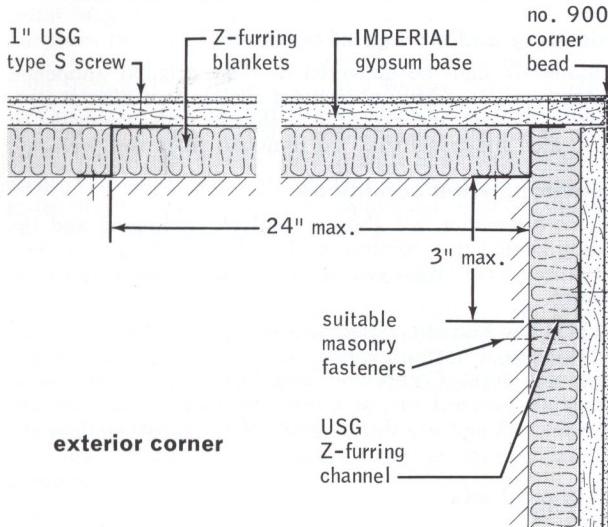
metal window jamb

USG Z-Furring Channels

In this assembly, USG Z-Furring Channels are used to mechanically attach THERMAFIBER Z-Furring Blankets to exterior walls. IMPERIAL Gypsum Base is screw-attached to the channels and finished with a thin veneer of high-strength IMPERIAL Plaster. USG Z-Furring Channels, suitable for $\frac{3}{4}$ " and 1" thick insulation, are formed from hot-dipped galvanized steel for added corrosion resistance.

This system provides a self-furred solid backup for IMPERIAL Base. The surface membrane is isolated to a great degree from the exterior wall. Fire-resistant THERMAFIBER Z-Furring Blankets provide a noncombustible assembly and offer low heat transmission. Blankets are a semi-rigid spun mineral-fiber mat, 1" thick, meeting the requirements for Class A construction. Thermal insulation values (U-factors) for various assemblies are shown at right. IMPERIAL Plaster, applied over the gypsum base in one or two coats, offers a strong abrasion-resistant interior surface.

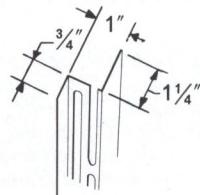
wall plan sections



design heat transmission coefficients (U-factors)

wall construction	nom. wall thickn.	unfin. wall	furred wall- (no insul.)	wall insulated with 1" THERMAFIBER Z-Furring Blankets
4" face brick 8" block	12"	.42	.26	.14
4" face brick 4" com. brick	8"	.48	.28	.15
poured conc. 140 lb./cu. ft.	8"	.69	.34	.16
conc. block sand & gravel aggregate	8" 12"	.59 .47	.29 .28	.15 .15

†Interior wall finish: $\frac{1}{2}$ " IMPERIAL Base and Plaster. All U-factors expressed in Btu/sq. ft./hr./°F, 75°F mean insulating temperature. Values based on 1965-6 ASHRAE Guide and winter condition (15 mph wind).



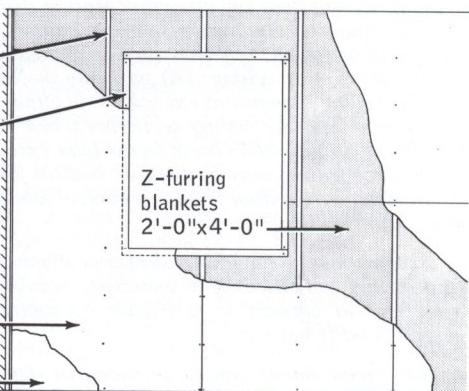
USG Z-furring channel

USG Z-furring channels spaced at 24" c to c

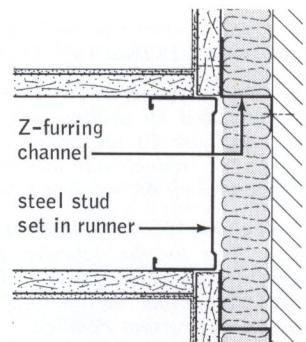
continuous wood nailers at openings

1/2" or 5/8"
IMPERIAL
gypsum base
applied vertical
or horizontal

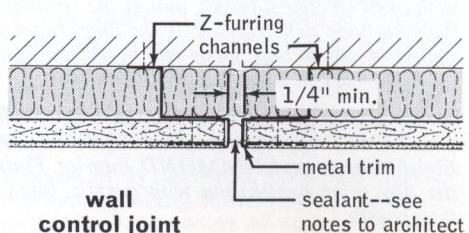
IMPERIAL
plaster



wall elevation



partition wall intersection



wall control joint

specifications

notes to architect

1. Metal door and borrowed-light frames should be at least 16-ga. steel, shop primed, and have throats accurately formed to overall thickness of partition. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchor clips should be 18-ga. steel welded in jamb (see details, page 4). Stud reinforcing described below is screw-attached to jamb anchor clips. Three-piece frames may also be used with these partitions.

For hollow-core doors up to 2'8" wide, ST5 steel studs may be used for reinforcing. For solid-core doors and hollow-core doors 2'8" to 4'0" wide, reinforcing should be ST10 steel studs. For doors over 4'0" wide, double doors and extra heavy doors such as used for X-ray rooms, two ST10 studs placed back-to-back should be used.

For added door frame restraint, spot-grouting at the jamb anchor clip is recommended. Spot-grouting is required for solid-core doors and doors over 2'8" wide. Apply DURABOND or USG Ready-To-Use Joint Compound just before inserting gypsum base into frame; do not terminate base against trim return. Plaster should be grooved at frame.

2. Gypsum base surfaces should be isolated with control joints or other means where: (a) partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling; (b) a ceiling abuts a structural element; dissimilar wall or partition or other vertical penetration; (c) construction changes within the plane of the partition or ceiling; (d) partition or furring run exceeds 30'; (e) ceiling dimensions exceed 50' in either direction; (f) the area within separate ceiling sections exceed 900 sq. ft.; (g) expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.

3. Penetrations of the lath-and-plaster diaphragm, such as door frames and borrowed-light openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.

4. Additional chases can be provided in steel studs (except in fire-rated construction) by cutting round holes up to $\frac{3}{4}$ of stud width, spaced 12" apart.

5. Shallow electrical outlet boxes are recommended when rigid insulation less than $1\frac{1}{2}$ " thick is used.

6. **Fixture Attachment**—Lightweight fixtures and trim should be installed by drilling and inserting expandable anchors in gypsum base for attachment screws. Wood or metal mounting strips for cabinets and shelving should be attached with toggle bolts through the gypsum base near studs.

7. **Ceramic Tile**—IMPERIAL Gypsum Base is not recommended as a base for the adhesive application of ceramic, metal and plastic tile. SHEETROCK W/R Gypsum Panels are recommended for this use (see U.S.G. Product Folder SA-927 in this series on Gypsum Panels).

8. Where these partitions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the partition. Back-to-back penetrations of the diaphragm and flanking paths should be eliminated. Door and borrowed-light openings are not recommended in sound control partitions.

9. All lime-putty finishes applied over IMPERIAL Basecoat Plaster must be properly sealed before decorating. IMPERIAL Finish Plaster and DIAMOND Interior Finish may be painted the day after application with acrylic, latex or vinyl breather-type paints.

10. Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.

11. During periods of low outside temperature, condensation may form on exterior walls, collecting airborne dirt to produce photographing or shadowing over fasteners and furring. This is a natural phenomenon which occurs through no fault in the products.

12. See U.S.G. product folders in this series: Gypsum Plasters, Bases & Accessories Folder SA-917 for general lathing and plastering specifications; Paint Products Folder SA-933 for paint specifications.

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather, all glazing shall be completed and the building heated to a minimum of 55°F. before gypsum base installation. Ventilation shall be provided to carry off excess moisture.

b. When low humidity, high temperatures and rapid drying conditions exist during gypsum base and plaster application, DURABOND Joint Compound and PERF-A-TAPE Reinforcement shall be used on all joints and internal corners and allowed to set and dry thoroughly before plaster application.

Part 2: products

2.1 materials

a. IMPERIAL Gypsum Base ($\frac{1}{2}$ ") ($\frac{5}{8}$) thick, 48" wide, square edge, (Regular) (Foil-Back) (FIRECODE) (FIRECODE "C"), lengths as required.

b. Laminating Adhesive—DURABOND Joint Compound-Taping or 90 mixed in accordance with manufacturer's directions (for double-layer application).

c. Fasteners— $\frac{3}{8}$ ", $\frac{7}{8}$ ", 1", $1\frac{1}{4}$ ", $1\frac{5}{16}$ ", $1\frac{3}{8}$ " and $2\frac{1}{4}$ " USG Brand Screws Type S; $1\frac{1}{2}$ " USG Brand Screws Type G.

d. USG Steel Studs—($1\frac{5}{8}$) (2") ($2\frac{1}{2}$) (3") ($3\frac{5}{8}$) (4") (6"), lengths as required.

e. USG Steel Runner—($1\frac{5}{8}$) (2") ($2\frac{1}{2}$) (3") ($3\frac{5}{8}$) (4") (6") for USG Steel Studs.

f. USG Metal Angle Runner, $1\frac{3}{8}$ " x $\frac{7}{8}$ " x 24-ga.

g. USG Metal Furring Channel and Clips.

h. IMPERIAL Tape—(Type P) (Type S) for joint reinforcement.

i. USG Cold-Rolled Channels ($\frac{3}{4}$) (1 $\frac{1}{2}$).

j. USG Adjustable Wall Furring Bracket.

- k. Accessories—USG (#800) (#900) Corner Bead, (701-A) (701-B) (801-A) (801-B) Metal Trim, (P-1) (P-2) Vinyl Trim, Control Joint #093, 16-ga. Tie Wire.
- l. THERMAFIBER (Sound Attenuation) (Z-Furring) Blankets.
- m. USG Z-Furring Channel.
- n. USG Acoustical Sealant.
- o. DURABOND Joint Compound and PERF-A-TAPE Reinforcement.

Part 3: execution

3.1 steel stud partition system erection

Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c., or to suspended ceilings with toggle or molly bolts spaced 16" o.c.

Position studs vertically, engaging floor and ceiling runners, and spaced (16") (24") o.c. When necessary, splice studs with 8" nested lap and one positive attachment per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are installed directly to exterior walls and possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.

Anchor all studs adjacent to door and window frames, partition intersections, and corners to ceiling and floor runner flanges with USG Metal Lock Fastener tool. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bolt or screw attachment (not required for frames with structural bar struts). Over metal door and borrowed-light frames, place a cut-to-length section of runner track, with a web-flange bend at each end, horizontally and secure with one positive attachment per flange. Position a cut-to-length stud (extending to the ceiling runner) at the location of vertical joints over door frame header.

3.2 single layer gypsum base erection

Apply gypsum base (vertically) (horizontally). Position all edges over stud flanges for vertical application; all ends over stud flanges for horizontal application. To maintain a true surface plane, arrange direction of application so leading edge of base is attached first to open end of stud flange. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.

For vertical application of base, space screws 12" o.c. in field of base and 8" o.c. staggered along vertical abutting edges. For horizontal base application, space screws 12" o.c. in field and along abutting end joints.

3.3 double layer gypsum base erection

For screw attachment, space screws 16" o.c. for both layers. Apply both layers of gypsum base vertically with joints in face layer offset from base layer joints. For $\frac{5}{8}$ " base, use 1" screws for base layer and $1\frac{5}{8}$ " screws for face layer. For $\frac{1}{2}$ " base, use $\frac{7}{8}$ " screws for base layer and $1\frac{5}{16}$ " screws for face layer.

In double-layer laminated construction, attach base layer with 1" type S screws spaced 8" o.c. at joint edges and 12" o.c. in field. Apply face layer vertically with DURABOND Joint Compound-Taping or 90 spread on back side, joints staggered approx. 12" and fastened to base layer with $1\frac{1}{2}$ " type G screws. Drive screws approx. 2' from ends and 4' o.c. in field of panel, 1' from ends and 3' o.c. along a line 3" from vertical edges.

3.4 chase wall erection

Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stub

nails or power-driven anchors 24" o.c., to suspended ceilings with toggle or molly bolts 16" o.c., or to wood framing with suitable fasteners 24" o.c.

Position steel studs vertically in runners, (16") (24") o.c., with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Anchor all studs adjacent to door and window frames, partition intersections and corners to floor and ceiling runner flanges with USG Metal Lock Fastener tool.

Cut cross bracing to be placed between rows of studs from gypsum base, 12" high by wall width. Space braces 48" o.c. vertically and attach to stud webs with six type S screws per brace. If larger braces are used, space screws 8" o.c. max. on each side. Attach single-layer or base-layer gypsum base with ($\frac{7}{8}$) (1") type S screws spaced 12" o.c. in field and 8" o.c. staggered at vertical joints.

Bracing of $2\frac{1}{2}$ " steel studs may be used in place of gypsum braces. Anchor web at each end of steel brace with two $\frac{3}{8}$ " pan head screws. When chase wall studs are not opposite, install steel stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal $2\frac{1}{2}$ " runner screw-attached to chase wall studs within the cavity.

3.5 ceiling grillage erection

Space 8-ga. hanger wires 48" o.c. along carrying channels and within 6" of ends of carrying-channel runs. In concrete, anchor hangers by attachment to reinforcing steel, by loops embedded at least 2" or by approved inserts. For steel construction, wrap hanger around or through beams or joists.

Install $1\frac{1}{2}$ " carrying channels 48" o.c., and within 6" of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel. Provide 1" clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12" and secure each end with double-strand 16-ga. tie wire.

Erect metal furring channels at right angles to $1\frac{1}{2}$ " carrying channels or main support members. Space furring (16") (24") o.c. and within 6" of walls. Provide 1" clearance between furring ends and abutting walls and partitions. Secure furring to carrying channels with clips or saddle-tie to supports with double-strand 16-ga. tie wire. At splices, nest furring channels at least 8" and securely wire-tie each end with double-strand 16-ga. tie wire.

At light troffers or any openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore lateral stability of grillage.

3.6 ceiling panel installation

Apply gypsum base of maximum practical length face down with long dimension at right angles to furring channels. Position end joints over channel web and stagger in adjacent rows.

Fit ends and edges closely, but not forced together. Fasten base to channels with 1" type S screws spaced 12" o.c. in field of base and along abutting ends and edges.

3.7 caged beam fireproofing

Position ceiling runners at least $\frac{1}{2}$ " from and parallel to beam and fasten to floor units with $\frac{1}{2}$ " type S-12 pan head screws spaced 12" o.c. Fabricate hanger brackets from $1\frac{1}{8}$ " steel runners allowing 1" clearance at bottom of beam. Space brackets 24" o.c. along beam and attach to ceiling runners with $\frac{1}{2}$ " type S-12 screws. Install lower corner runners parallel to beam and fasten to brackets with $\frac{1}{2}$ " type S-12 screws.

Screw-attach three layers of $\frac{5}{8}$ " IMPERIAL FIRECODE Gypsum Base to channel brackets installing vertical panels first, with bottom panels overlapping lower edges of vertical panels in

each layer. Attach panels to channel brackets with 1" type S screws 16" o.c. for base layer, 1 $\frac{3}{8}$ " type S screws 12" o.c. for middle layer and 2 $\frac{1}{4}$ " type S screws 8" o.c. for face layer. Install wire mesh over bottom middle layer panel, extend 1 $\frac{1}{2}$ " up each side and fasten with 1 $\frac{3}{8}$ " screws used to fasten panels.

3.8 wall furring channel attachment—direct

Attach metal furring channels vertically, spaced (16") (24") o.c., to masonry or concrete surfaces with hammer-set or power-driven fasteners or concrete stub nails staggered 24" o.c. on opposite flanges. Where furring channel is installed directly to exterior wall and a possibility of water penetration through walls exists, install asphalt felt protection strip between furring channel and wall.

3.9 wall furring channel attachment—bracketed

Attach adjustable wall furring brackets with serrated edges up, 36" o.c. horizontally, 48" o.c. vertically, within 4" of columns or other abutting construction, within 6" of floor and ceiling, and as required above and below windows, with (2" cut nail in mortar joints of brick, clay tile or concrete block, or in field of lightweight aggregate blocks) (5/8" concrete stub nails, power-driven nails or other suitable fasteners in poured concrete). Place fastener in top hole of bracket. Lay cold-rolled channels horizontally with flanges down, on furring brackets, plumb with other channels, and tie with double-strand 16-ga. or triple-strand 18-ga. wire, bend down excess bracket length. Erect metal furring channel vertically, spaced (16") (24") o.c. and tie with double-strand 16-ga. or triple-strand 18-ga. wire at each channel junction.

At outside corner, attach gypsum base to short horizontal mitered furring channels or to a vertical steel stud.

3.10 Z-furring channel attachment

Erect mineral fiber insulation vertically and hold in place with Z-furring channels spaced 24" o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24" o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner; start from this furring channel with a 3" strip of insulation followed by furring channel in the normal manner. At interior corners, space second channel no more than 12" from corner and cut insulation to fit. Hold insulation in place until plaster base is installed with 10" long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel.

Apply gypsum base (vertically) (horizontally) with vertical joints occurring over channels. Attach gypsum base with 1"

type S screws spaced 12" o.c. in field and at edges, and with 1 $\frac{1}{4}$ " type S screws spaced 12" o.c. at exterior corners. Use DURABOND Compound and PERF-A-TAPE Reinforcement on all joints, interior corners, trim and corner beads and allow to set and dry thoroughly before finish plaster application.

3.11 accessory application

When low humidity, high temperatures and rapid drying conditions exist, use DURABOND Joint System on all joints and internal corners and allow to set and dry thoroughly before applying finish plaster.

a. Reinforcing Tape—Apply over full length of all gypsum base joints; do not overlap at intersections.

Type P Tape—Firmly press along entire length to insure firm wrinkle-free attachment.

Type S Tape—Apply with spring-driven stapler using $\frac{3}{8}$ " staples. Use two staples at each end of tape and stagger intermediate staples 24" along length of tape. At wall-ceiling intersections and interior corners, staple tape 24" o.c. along ceiling edge or on one edge only. For fire-rated assemblies, staple tape 8" o.c.

b. Laminating Adhesive—Spread to provide $\frac{1}{2}$ " adhesive beads 4 $\frac{1}{2}$ " o.c. for full sheet lamination. For strip lamination, apply adhesive in vertical strips of four $\frac{1}{2}$ " beads 1 $\frac{1}{2}$ " to 2" o.c. Space strips 24" o.c.

c. Corner Bead—Reinforce all vertical and horizontal exteriors corners with corner bead fastened with $\frac{9}{16}$ " rosin-coated staple 12" o.c. on both flanges along entire length of bead.

d. Casing Bead—Where wall or partition terminates against masonry or other dissimilar material, apply metal trim over gypsum base and fasten with $\frac{9}{16}$ " rosin-coated staples 12" o.c.

e. Screws—Power-drive and set so screwhead is flush with surface of gypsum base without tearing through face paper.

f. Control Joints—Break gypsum base behind joint and back by double studs or furring channels. Attach control joint to gypsum base with $\frac{9}{16}$ " rosin-coated staples spaced 12" o.c. on both flanges along entire joint length.

g. P-1 Vinyl Trim—Slip trim over gypsum base with long flange behind base. Install base with trim firmly abutting surface.

h. P-2 Vinyl Trim—Provide $\frac{1}{8}$ " to $\frac{3}{8}$ " relief for trim at gypsum base angle. Remove protective paper from adhesive on web of trim and insert trim into relief, adhesive against wall surface. Press upward until long flange seats against ceiling.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, IMPERIAL, DIAMOND, STRUCTO-GAUGE, SHEETROCK, THERMAFIBER, DURABOND, PERF-A-TAPE, PYROBAR, FIRECODE, DIAMOND.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

partition applications

fire rating	description	test no.	stc rating	comments
			11-f 16-f	
1 hr. est	Wd Stud—Resil $\frac{5}{8}$ " IMPERIAL gypsum base & veneer plaster—2x4 16" o.c.—2 layers base one side screw att & lamin—single layer opp side screw att to RC-1 chan—3" THERMAFIBER ins blkts— $\frac{1}{16}$ " veneer plaster both sides—perimeter caulked wt 11 width 6 $\frac{1}{8}$ "	CK-654-38 (s)	53	
1 hr.	Wd Stud—Resil $\frac{5}{8}$ " IMPERIAL FIRECODE "C" gypsum base & veneer plaster—2x4 16" o.c.—3" THERMAFIBER ins blkts—RC-1 chan one side spaced 24" o.c.—base att with 1" Type S screws—opp side att direct with 1 $\frac{1}{4}$ " Type W screws— $\frac{1}{16}$ " veneer plaster both sides—perimeter caulked wt 8 width 5 $\frac{1}{2}$ "	UL Des U311 (was 27-1 hr) CK-664-4 (s) USG-111-FT-G&H (s)	49 50	Good sound isolation combined with highly abrasion-resistant surface. CK-664-4 based on $\frac{1}{2}$ " plaster base
1 hr.	Wd Stud— $\frac{1}{2}$ " IMPERIAL FIRECODE "C" gypsum base att direct & veneer plaster—2x4 16" o.c.—base nailed 7" o.c. 6d nails— $\frac{1}{16}$ " veneer plaster joints taped wt 7 width 4 $\frac{3}{4}$ "	U of C 10-27-64 (f)	N/A	Excellent surface hardness and abrasion resistance
1 hr.	Wd Stud— $\frac{5}{8}$ " IMPERIAL FIRECODE "C" gypsum base & veneer plaster—2x4 16" o.c.—base nailed 7" o.c. 1 $\frac{1}{8}$ " cem ctd nails— $\frac{1}{16}$ " veneer plaster both sides—joints taped wt 7 width 5"	UL Des U305 (was 5-1 hr)	N/A	
2 hrs.	Wd Stud—2 layers $\frac{5}{8}$ " IMPERIAL FIRECODE "C" gypsum base & $\frac{1}{16}$ " veneer plaster both sides—2x4 16" o.c.—base layer 6d nails 6" o.c.—face layer lamin or nailed to base—joints taped wt 12 width 6 $\frac{1}{4}$ "	UL Des U301 (was 4-2 hr)	N/A	Basic 2-hour partition construction

NOTE: Partition widths based on 3 $\frac{1}{8}$ " stud width.

ceiling applications

fire rating	description	test no.	sound rating	comments
			STC IIC	
1 hr.	$\frac{5}{8}$ " IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—wd joist 2x10 16" o.c.—1" nom wd sub & fin flr—pl base att with 5d nails 6" o.c.— $\frac{1}{16}$ " veneer plaster—joints taped clg wt 3	UL Des L512 (was 42-1 hr)	(f) N/A	Fire rating also applies with $\frac{3}{8}$ " MASTICAL or FLO-FILL underlayment compound over plywood subfloor
1 hr.	Resil $\frac{5}{8}$ " IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—wd joist 2x10 16" o.c.—1" nom wd sub & fin flr—RC-1 chan spaced 16" o.c. and at end joints—pl base att with Type S screws 12" o.c.— $\frac{1}{16}$ " veneer plaster—joints taped clg wt 3	UL Des L514 (was 41-1 hr)	(f) N/A	Fire rating also applies with $\frac{3}{8}$ " MASTICAL or FLO-FILL underlayment compound over plywood subfloor
1 hr.	$\frac{5}{8}$ " IMPERIAL FIRECODE gypsum base & veneer plaster ceiling—Amer Plywood Assn 2-4-1 flr 4x10 wd joist 48" o.c.—USG met fur chan—pl base att with 1" Type S screws— $\frac{1}{16}$ " plaster—joints taped clg wt 3	UL Des L508 (was 28-1 hr)	(f) N/A	Only 1-hr. residential veneer plaster system based on 48" joist spacing
1 hr.	$\frac{5}{8}$ " IMPERIAL FIRECODE gypsum base & veneer plaster ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—pl base att with 6d nails 6" o.c.— $\frac{1}{16}$ " veneer plaster—joints taped clg wt 3	UL Des L501 (was 1-1 hr)	(f) N/A	
2 hrs.	Resil 2 layers $\frac{5}{8}$ " IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan screw att over base layer—face layer screw att to chan 12" o.c.— $\frac{1}{16}$ " veneer plaster—joints taped clg wt 5	UL Des L511 (was 272-2 hr)	50 est	

description

In these systems, a veneer ($\frac{1}{16}$ " to $\frac{3}{32}$ " thick) of specially formulated gypsum plaster is applied in one coat over IMPERIAL Gypsum Base attached to wood framing. DIAMOND Interior Finish, offering superior coverage and workability, provides economical surfaces with outstanding beauty and durability. Higher-strength IMPERIAL Finish Plaster provides abrasion and crack-resistant walls and ceilings of exceptional hardness. IMPERIAL Basecoat Plaster may be used as a superior base in a two-coat system for either finish. IMPERIAL Base, 4 ft. wide, has a high-strength, high-density core, either regular, FIRECODE or FIRECODE "C" type, covered with special absorption face paper designed for veneer plastering. Veneer plaster systems, as outlined below, are suitable for partitions and ceilings wherever standard plaster or drywall systems are used.

Partitions—Versatile IMPERIAL Gypsum Base is directly attached to wood studs with USG Brand Type W Screws or nails. Where a 2-hour fire rating is required, double-layer FIRECODE "C" Base is used. To provide superior sound control, IMPERIAL Base is resiliently attached to one side of wood

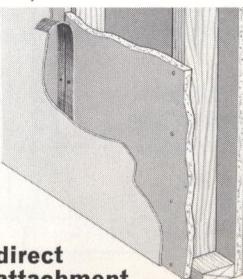
studs using the RC-1 Resilient Channel. Base is fastened to channels with power-driven USG Brand Type S Screws. This system with THERMAFIBER Insulating Blanks stapled in the stud cavity, provides one of the most economical party walls.

Ceilings—High-quality, fire-resistant ceilings are rapidly installed with IMPERIAL Base applied directly to wood joists or over resilient channels for added sound control. With

(continued on page 2)



resilient attachment



direct attachment

description (continued from page 1)

double-layer base separated by resilient channels, a 2-hour fire rating is provided.

IMPERIAL Gypsum Base and Plaster are also used with steel studs and furring channels for noncombustible interior partitions, party walls, chase walls and furring (see System Folder SA-912 in this series for details).

function and utility

Veneer plaster systems are ideal for load-bearing interior partitions and ceilings in residences, motels, garden apartments and other multi-family buildings requiring fire protection plus these extra features:

Durability—The high-strength (approx. 3,000 psi), abrasion- and crack-resistant features of IMPERIAL Plaster offer the durability needed in high-traffic areas, and obtainable with few other materials.

Fire Resistance—2 hours with double-layer $\frac{5}{8}$ " FIRECODE "C" Base; 1-hour rating using single-layer base in walls and ceilings (see table, page 1).

Sound Control—The systems offer sound isolation up to 53 STC with the use of resilient channels and insulating blankets; suitable for party walls (see table, page 1).

Fast Completion—Veneer plasters are easily applied, eliminate drying delays and are usually ready for next-day decorating or painting with breather-type paints. The white surface obtainable with DIAMOND Finish, particularly when sand-floated or textured, is often acceptable without further decoration.

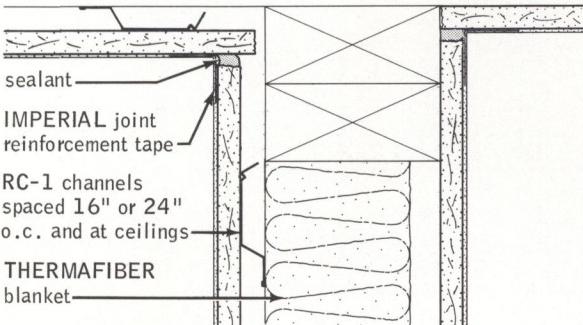
Economy—Simple, inexpensive components erect quickly at a lower cost than conventional plaster systems. Speedy plaster application plus savings in decorating time make these systems competitive to drywall assemblies in many instances.

limitations

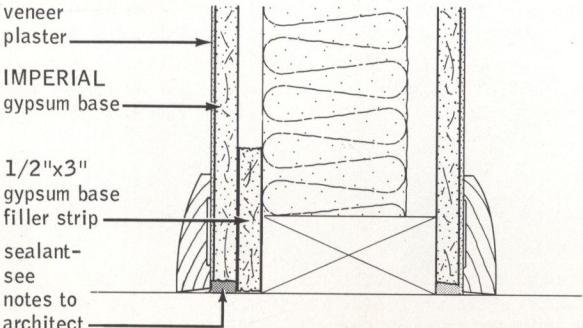
1. These constructions should not be used where normally exposed to excessive moisture, humidity or temperature.
2. Type S Screws must be used for attachment of single-layer base to RC-1 Resilient Channels.

details

ceiling attachment



floor attachment



3. RC-1 Resilient Channels must be attached to framing only with 1 $\frac{1}{4}$ " Type W Screws. Nails should not be used.

4. Resilient ceilings should not be installed beneath highly flexible floor joists. Install only to framing meeting "Wood Framing Requirements" (see Specifications).

5. Max. framing spacing: 16"; except 24" for double-layer assemblies and $\frac{5}{8}$ " base with two-coat plaster application.

fastener spacing—IMPERIAL Gypsum Base

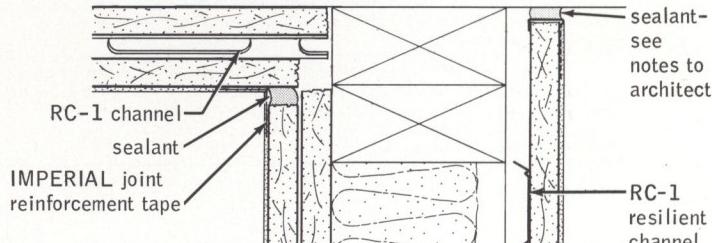
thickn. of base	framing	type fastener	max. fastener spacing
$\frac{1}{2}$ " with RC-1 channel	wood	Nails (for regular base)—1 $\frac{1}{4}$ ", 13 ga., $\frac{15}{64}$ " head, ring or barbed shank, blued, bright or cement coated	7" ceilings 8" walls
		Nails (for FIRECODE base)—1 $\frac{1}{8}$ " 5d cooler type cement coated	6" ceilings 7" walls
		Screws—1 $\frac{1}{4}$ " USG Brand Type W	12"
		Screws— $\frac{5}{8}$ " USG Brand Type S	12"
$\frac{5}{8}$ " with RC-1 channel	wood	Nails (for regular base)—1 $\frac{3}{8}$ ", 13 ga., $\frac{15}{64}$ " head, ring or barbed shank, blued, bright or cement coated	7" ceilings 8" walls
		Nails (for FIRECODE base)—1 $\frac{1}{8}$ " 6d cooler type cement coated	6" ceilings 7" walls
		Screws—1 $\frac{1}{4}$ " USG Brand Type W	12"
		Screws—1" USG Brand Type S	12"

fixture attachment load table

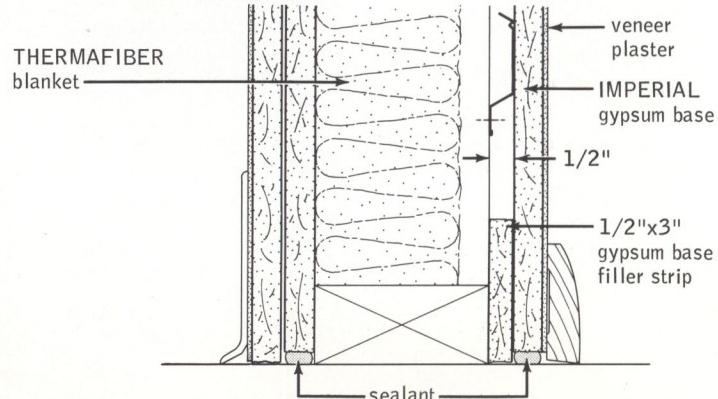
type fastener or attachment	allowable withdrawal resistance—lbs.	allowable shear resistance—lbs.
fiber or plastic plug	#6 screw	10
	#8 screw	15
	#10 screw	20
	#12 screw	30
	#14 screw	30
toggle or molly bolt	$\frac{1}{8}$ " bolt	20
	$\frac{3}{16}$ " bolt	30
	$\frac{1}{4}$ " bolt	40
no. 8 sheet metal screw into 25-ga. metal sheet	50	100

scale: 3" = 1'-0"

ceiling attachment

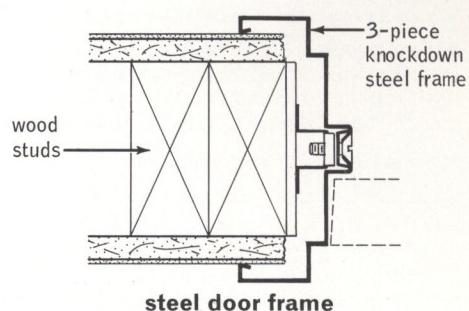
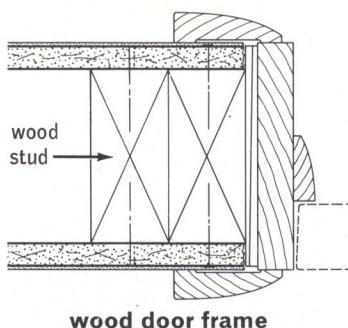
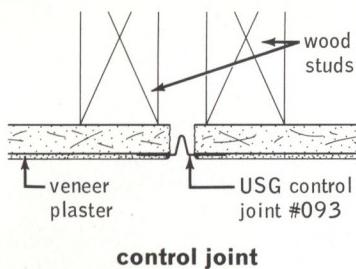


floor attachment



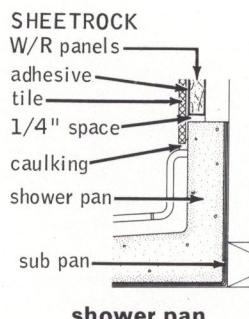
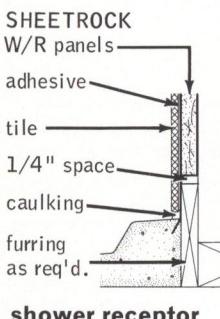
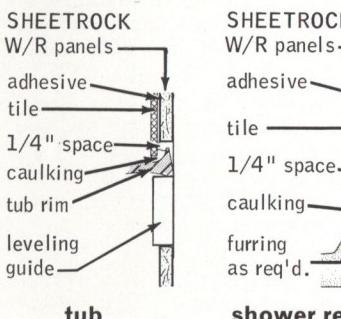
details

miscellaneous

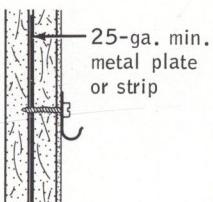
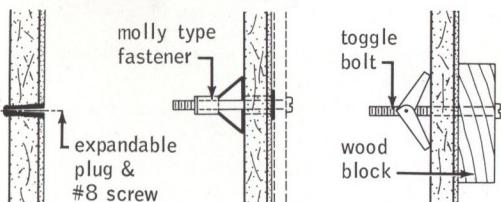


tub and shower details—SHEETROCK W/R panels

single layer panels



fixture attachments (light)



specifications—notes to architect

1. Gypsum base surfaces should be isolated with control joints or other means where: (a) partition abuts a structural element (except floor) or dissimilar wall or ceiling; (b) construction changes within the plane of partition or ceiling; (c) partition run exceeds 30'; (d) ceiling dimensions exceed 50' in either direction.

Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.

2. Penetrations of the lath-and-plaster diaphragm, such as door and borrowed-light openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.

3. Plenum or attic space closed by ceiling installation should be vented with a min. $\frac{1}{2}$ sq. in. net free vent area per 1 sq. ft. of horizontal surface.

4. Where these partitions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the partitions.

Back-to-back penetrations of the diaphragm and flanking paths should be avoided. Door and borrowed-light openings are not recommended in sound control partitions.

5. **Wood Framing Requirements**—Wood framing meeting the

minimum requirements of FHA, ALSC and local building codes is necessary for proper performance.

6. Ceramic Tile—IMPERIAL Gypsum Base is not recommended as a base for the adhesive application of ceramic, metal and plastic tile. SHEETROCK W/R Gypsum Panels are recommended for this use (see details).

7. All lime-putty finishes applied over IMPERIAL Basecoat Plaster must be properly sealed before decorating. DIAMOND Interior Finish and IMPERIAL Finish Plaster may be painted the day after application with acrylic latex or vinyl breather-type paints.

8. Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.

9. See U.S.G. product folders in this series: Gypsum Plasters, Bases & Accessories Folder SA-917 for general lathing and plastering specifications; Paint Products Folder SA-933 for paint specifications; Insulation Products Folder SA-705 for insulation specifications.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather, all glazing shall be completed and the building heated to a minimum of 55°F. before gypsum base installation. Ventilation shall be provided to carry off excess moisture.

b. When low humidity, high temperatures and rapid drying conditions exist during gypsum base and plaster application, DURABOND Joint Compound and PERF-A-TAPE Reinforcement shall be used on all joints, internal corners, trim and corner beads and allowed to set and dry thoroughly before plaster application.

Part 2: products

2.1 materials

- a. IMPERIAL Gypsum Base—(1/2") (5/8") thick, 48" wide, (Regular) (Foil-Back) (FIRECODE) (FIRECODE "C"), lengths as required.
- b. RC-1 SHEETROCK Resilient Channel.
- c. 3" THERMAFIBER Insulating Blankets (size).
- d. Fasteners—(choose from page 2).
- e. IMPERIAL Tape—(Type P) (Type S) for joint reinforcement.
- f. USG No. (800) (900) Corner Bead.
- g. USG Trim (701-A) (701-B) (801-A) (801-B) (P-1) (P-2).
- h. USG No. 093 Control Joint.
- i. USG Acoustical Sealant.
- j. PERF-A-TAPE Reinforcement and DURABOND Joint Compound.

Part 3: execution

3.1 gypsum base—direct attachment

Apply IMPERIAL Gypsum Base on ceilings first, (horizontally—right angles to framing) (vertically—parallel to framing). Position all ends over framing in horizontal application; all edges over framing members in vertical application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together.

Stagger end joints in successive courses with joints on opposite sides of partition placed on different studs. Float gypsum base at vertical interior angles by attaching the overlapping sheet of base only, at the angle; at horizontal interior angles by attaching both sheets of base no closer than 8" from the angle.

Drive fasteners in field of base first, working toward ends and edges. Hold base in firm contact with framing while driving fasteners. Space nails 7" to 8" o.c., screws 12" o.c., and perimeter fasteners not less than 3/8" from ends or edges. Drive fastener heads flush with surface of base, not dimpled, and without breaking paper. Wherever base is not tight against framing, drive another fastener within 1 1/2" of first.

Cut base to fit neatly around pipes, electrical outlets, medicine cabinets, etc. Remove any loose face paper at cut and fill gaps or holes with quick-setting plaster.

3.2 gypsum base—resilient attachment

Position RC-1 Resilient Channels at right angles to wood framing, space (16") (24") o.c. and attach with 1 1/4" type W screws driven through holes in channel mounting flange.

On walls, attach 1/2" x 3" wide continuous filler strips to both sides of bottom plate. Install channels with mounting flange down, top channel max. 6" down from ceiling, bottom channel (16") (24") up from floor. Extend channels into all corners and attach to corner framing.

On ceilings, position first and last channels max. 6" from wall-ceiling angle. Cantilever channel ends no more than 6".

Splice channels by nesting directly over framing member; screw-attach through both flanges. Reinforce with screws located at both ends of splice.

Where cabinets will be installed, attach RC-1 Channels to studs at center of top and bottom cabinet hanger brackets. When distance between hangers exceeds 24" o.c., install additional channel at midpoint between hangers.

Apply IMPERIAL Gypsum Base, ceiling first, with long dimension at right angles to channels, and end joints neatly fitted and centered over channel attachment flange. Attach with (1/8") (1") USG type S screws spaced 12" o.c. across each channel and perimeter screws not less than 3/8" from ends and edges. Support plaster base around all cut-outs and openings.

For double-layer ceiling system, apply base layer with long edges across joists and end joints staggered. Fasten base to framing with 8d cement-coated nails spaced 7" o.c. Attach resilient channel through base layer perpendicular to framing with 1 1/8" type S screws. Install face layer with long dimension across channels using 1" type S screws spaced 12" o.c.

3.3 accessory application

a. Reinforcing Tape—Apply over full length of all gypsum base joints; do not overlap at intersection.

Type P Tape—Press firmly along entire length to insure firm wrinkle-free attachment.

Type S Tape—Apply with spring-driven stapler using 3/8" staples. Use two staples at each end of tape and stagger intermediate staples 24" o.c. along length of tape. At wall-ceiling intersections and interior corners, staple tape 24" o.c. along ceiling edge or on one edge only. For fire-rated assemblies, staple tape 8" o.c.

b. Corner Bead—Attach to all vertical and horizontal exterior corners with nails or 9/16" rosin-coated staples spaced 12" o.c. along both flanges along entire length of bead.

c. Casing Bead—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum base and fasten with 9/16" rosin-coated staples 12" o.c.

d. Vinyl Trim—Slip USG P-1 Trim over gypsum base with long flange behind base. Install gypsum base with trim firmly abutting surface. For P-2 Vinyl Trim, provide 1/8" to 3/8" relief at ceiling perimeter. Remove protective paper from adhesive on web of trim and insert trim into relief, adhesive against wall surface. Press upward until long flange seats against ceiling.

e. Control Joint—Install in direct-mounted face layer. Break base behind joint and back by double studs; attach joint to gypsum base with 9/16" rosin-coated staples spaced 12" o.c. on both flanges along entire joint length.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, IMPERIAL, SHEETROCK, THERMAFIBER, PERF-A-TAPE, DURABOND, FIRECODE, DIAMOND, MASTICAL, FLO-FILL.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

This bulletin replaces former U.S.G. Technical Folder SA-914.

By request only

Metal-Framed USG Metal Lath and Plaster- Partitions and Ceilings

description

Versatile assemblies consisting of USG Metal Lath attached to a metal framing of open-web TRUSSTEEL Studs or USG Cold-Rolled Channels are equally suited to complex contoured shapes and flat surfaces.

Conventional gypsum plasters, applied to the lath, provide a strong, reinforced plaster membrane, easily decorated and maintained.

Metal lath for these assemblies is available in three types (see Specifications, page 4). 3.4-lb. Diamond Mesh Lath is used as the plaster base for partition applications; Poly-backed Diamond Mesh Lath is ideal for machine application of plaster. The excellent mechanical keying properties and equal distribution of reinforcing provided by metal lath give assemblies exceptional fire resistance to meet design requirements (see table, page 2).

TRUSSTEEL Studs utilize a truss design for superior strength, are fabricated in five widths and factory-cut to job lengths. Studs are formed of 7-ga. cold-drawn wire with 90,000 psi tensile strength, are attached to the floor and ceiling with runner tracks and stud shoes to produce an exceptionally strong non-load bearing steel framing system.

Open web of stud provides maximum free space for encasing pipes, conduits or ducts, horizontally, vertically or diagonally. Where more free space is required, core walls are easily constructed using TRUSSTEEL Studs and 3/4-in. channel bracing.

The various systems meeting other special requirements are outlined below:

Interior Partitions—USG Metal Lath is attached to TRUSSTEEL Studs with SUPER-TITE Clips and/or tie wire. The SUPER-TITE Clip offers fast, secure attachment and permits panelization of components when diamond mesh lath is used. With 4-in. TRUSSTEEL Studs and 3-1/4 in. STRUCTO-LITE Plaster in the stud cavity, the system provides a 4-hour fire rating and is suitable for smoke tower construction.

Ceilings—USG Metal Lath and gypsum plaster, attached to a conventional light channel grillage furred or suspended from the construction above, provides fire-resistance ratings of 1-1/2 to 4 hours. Caged beam fireproofing, suitable for protection of beams and girders, is also provided.

Wall Furring—TRUSSTEEL Studs, metal lath and plaster provide exterior wall furring with pipe chase clearance and a readily decorated interior wall surface. Framing, when braced, is suitable for heights up to 26 ft.; when free-standing may be used up to 17 ft.

Column Fireproofing—Metal lath, plain or self-furring, held in place around columns with channels and tie wire, provides lightweight, compact fire protection for steel columns.

Exterior Curtain Walls—Poly-backed metal lath attached to TRUSSTEEL Studs serves as an excellent base for portland cement-lime stucco in lightweight, low-cost USG Curtain Wall Systems (see U.S.G. Bulletin PM-149 for applications.)

function and utility

Suitable for use in new construction—commercial, institutional and industrial—wherever fire protection and an easily decorated and maintained interior surface is required.

Fire Protection—Noncombustible components provide systems with up to 4-hour fire-resistance ratings (see table, page 2).

Versatility—Walls and ceilings with curved designs to accommodate acoustical treatment or unusual lighting effects are readily shaped with USG Diamond Mesh Lath.

Economy—Structural integrity, strength, sound isolation, open core or plenum space and fire protection are provided by these systems at a lower cost than other noncombustible assemblies. The fire-resistance ratings can reduce insurance premiums.

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From the collection of:

Mike Jackson, FAIA

fire & sound ratings

partition applications

description	test no.	fire rating
3/4" TRUSSTEEL studs 16" o.c.—3.4# diamond mesh lath—3/4" 100:2-100:2 gypsum-sand plaster weight 16 width 4 1/4"	BMS-92 table 31 NBS-229 F44 (1)	1 hr.
3/4" TRUSSTEEL studs 16" o.c.—3.4# diamond mesh metal lath directly attached with SUPER-TITE clips—3/4" 100:2-100:2 gypsum-sand plaster weight 16 width 4 1/4"	T-4228-OSU	1 hr.
2 1/2" TRUSSTEEL studs 16" o.c.—3.4# diamond mesh metal lath—3/4" 100:1 gypsum-wood fiber-sand plaster weight 17 width 4 1/4"	UL-R4024-9-10	2 hr.
4" TRUSSTEEL studs 16" o.c.—one side 3.4# poly-backed diamond mesh metal lath directly attached & 3/4" cement-lime plaster—3 1/4" STRUCTO-LITE (Type S) plaster in stud cavity—opposite side 3.4# diamond metal lath & 3/4" 100:2-100:3 gypsum-sand plaster weight 30 width 5 1/2"	UL Des U402 (was 13-4 hr)	4 hr.

ceiling applications

description	test no.	fire rating
Suspended 3.4# diamond mesh metal lath & 3/4" 100:2-100:3 gypsum-sand plaster—rib type steel roof deck with 1" wood-fiber insulation ceiling weight 10	NBS-57	1 1/2 hr.
Suspended 3.4# diamond mesh metal lath & 1" 100:2 gypsum-sand plaster—rib type steel roof deck with 1 1/2" wood-fiber insulation ceiling weight 13	NBS-58	1 1/2 hr.
3/4" cold-rolled channel furred or suspended—3.4# diamond mesh metal lath & 5/8" 100:2-100:3 gypsum-sand plaster—2 1/2" concrete on riblath over bar joist ceiling weight 9	BMS-92 table 43	2 hr.
3/4" cold-rolled channel furred or suspended—3.4# diamond mesh metal lath & 3/4" 100:1-100:1 gypsum wood fiber-sand plaster—2 1/2" concrete on riblath over bar joist ceiling weight 10	UL R5429-1	2 1/2 hr.
3/4" cold-rolled channel suspended 15 1/2" below deck & 3 1/2" below beam—3.4# diamond mesh metal lath & 5/8" STRUCTO-LITE (Type R) plaster—2" concrete over cellular steel floor ceiling weight 5	UL Des A403 (was 11-3 hr)	3 hr. (beam 4 hr.)
3/4" cold-rolled channel furred or suspended—3.4# diamond mesh lath & 7/8" neat wood fiber gypsum plaster—2 1/2" concrete on riblath over bar joist ceiling weight 9	BMS-92 table 43	3 hr.
3/4" cold-rolled channel 13" o.c. suspended 3 1/2" below beam—3.4# diamond mesh metal lath & 7/8" STRUCTO-LITE (Type S) plaster—2" concrete over fluted steel floor ceiling weight 6	UL Des D401 (was 12-4 hr)	4 hr. (beam 4 hr.)
3/4" cold-rolled channel suspended 7 1/4" below deck & 2" below beam—3.4# diamond mesh metal lath & 5/8" 100:3 gypsum-perlite plaster basecoat—1/2" acoustical plaster—concrete over cellular steel floor ceiling weight 7	GA-NBS-338	4 hr. (beam 4 hr.)

beam applications

Caged Beam Fireproofing—9-ga. galvanized wire wrapped around beam 18" o.c. bent over bottom flange—3.4# self-furring diamond mesh metal lath—7/8" mill-formulated gypsum plaster UL 40 U18.3 Type (S)	UL Des A701 (was 10-2 hr)	2 hr.
Caged Beam Fireproofing—3.4# self-furring diamond mesh metal lath enclosing beam—1 1/2" 100:2 gypsum-perlite plaster UL 40 U18.16	UL Des D403 (was 8-4 hr)	4 hr.

NOTE: Plaster thickness measured from face of lath including 1/16" finish.

(1) 41 STC sound rating at 11 frequencies.

limitations

1. Non-load bearing construction.
2. Stud spacing limited to 16 in. o.c. for 3.4-lb. Diamond Mesh Lath and 19 in. o.c. for 3.4-lb. 1/8 in. Z-Riblath (see tabular data for limiting heights).

span of lath between cross furring

3. Door frames must be fabricated and anchored to prevent twisting and impact vibration (see detail, page 7).
4. To retain maximum sound isolation, precautions must be taken to prevent sound leakage (see Specifications).
5. Where mechanically suspended acoustical tile ceilings are used, finished partitions should extend from structural slab to structural slab, closing all openings.
6. In ceiling assemblies, certain precautions concerning construction, isolation and ventilation are necessary for good performance (see Specifications).

partition thickness—limiting heights

stud width	section modulus	finished thickness	maximum partition heights (1)	
			diamond mesh or 1/8" riblath	studs 16" o.c.
1 1/2"	.0635 ³	3 1/8"	9'	—
2 1/2"	.1056 ³	4"	15'	14'
3 1/4"	.1420 ³	4 3/4"	21'	18'
4"	.1825 ³	5 1/2"	22'	20'
6"	.277 ³	7 1/2"	26'	24'

(1) Limiting heights based on L/360 deflection.

(2) For 1/8" 3.4# Z-riblath.

non fireproofing core walls

Core walls, as vertical shafts encasing the usual plumbing supply and waste lines, vent ducts and electrical conduits, require more free space than can be provided within the usual partition assembly.

Core walls are easily constructed using TRUSSTEEL Studs and metal lath provided proper bracing is used to compensate for the stress skin action of the one side. The non-lathed side of the studs should be braced with 3/4-in. continuous channel girts at quarter points vertically or 48 in. o.c. maximum, and 3/4-in. channel bracket mid-girts spaced 36 in. o.c. horizontally.

exterior wall furring

It is recommended that all exterior masonry walls be furred. Asphaltic or bituminous bonding agents are not recommended as a base. TRUSSTEEL Studs, metal lath and plaster provide an exterior wall furring system that offers maximum free space for encasement of pipes, ducts or conduits and a finished, readily decorated interior wall surface.

Construction consists of TRUSSTEEL Studs as vertical members, braced with horizontal 3/4-in. channels spaced 4 ft. o.c. max. on back chord. A channel at the mid-point between floor and ceiling is attached to the wall with USG Adjustable Wall Furring Brackets spaced not more than 32 in. o.c. horizontally. TRUSSTEEL Studs, with spacing determined by maximum allowable spacing of supports for type of metal lath used (see table, page 3) are wire-tied to these horizontal channels. Metal lath is wire-tied to TRUSSTEEL Studs and plastered to 5/8-in. grounds, over face of lath. The Adjustable Wall Furring Brackets and extra channel at mid-height may be omitted to obtain free-standing furring.

TRUSSTEEL stud size	maximum height (1)	
	braced furring	free-standing furring
1½"	9'	6'
2½"	15'	10'
3¼"	21'	14'
4"	22'	15'
6"	26'	17'

(1) Based on 16" spacing between studs and L/360 deflection.

adjustable wall furring brackets

Attach wall furring spaced not more than 32 in. o.c. horizontally and 48 in. o.c. vertically. After attachment, bend bracket to horizontal position. Wire-tie plumbed channel to bracket ¼-in. (2¼ in. max.) from wall. Bend excess of bracket down.

suspended ceilings

These lightweight ceiling assemblies consist of USG Metal Lath wire-tied to a conventional light channel grillage furred or suspended from the construction above. Gypsum plaster is applied to the lath to provide a noncombustible, reinforced lath and plaster membrane. Fire-resistance rating up to 4 hours, suitable for protection of beams and girders, can be obtained (see table, page 2).

These systems serve to conceal and protect structural and mechanical elements with a fire-resistant ceiling that is easily contoured, decorated and maintained.

Type and spacing of hangers, main runners and furring for design of the grillage are shown.

hangers

hanger size & type	max. clg. area support hanger
9-ga. galvanized wire	12.5 sq. ft.
8-ga. galvanized wire	16 sq. ft.
3/16" mild steel rod (1)(2)	25 sq. ft.
1/4" mild steel rod (1)(2)	25 sq. ft.
3/16"x1" mild steel flat (1)(2)	25 sq. ft.

(1) Rods galvanized or painted with rust inhibitive paint, or galvanized straps are recommended where severe moisture conditions may occur. (2) Not manufactured by United States Gypsum.

cross furring members

cross furring size	max. c. to c. spacing of cross furring	main runner or support spacing
3/4" c.r. channel	24"	3'-0"
3/4" c.r. channel	19"	3'-6"
3/4" c.r. channel	16"	4'-0"
3/8" pencil rods (1)	19"	2'-0"
3/8" pencil rods (1)	12"	2'-6"
1" c.r. channel	24"	4'-0"
1" c.r. channel	19"	4'-6"
1" c.r. channel	12"	5'-0"

(1) Primary usage is on furred ceiling members.

main runner—carrying channels

main runner c.r. channel size	max. spacing of hangers along runners	max. c. to c. spacing of main runners
3/4"	2'	3'
3/4"	3'(1)	2'-3"
1 1/2"	3'	4'
1 1/2"	3'-6"	3'-6"
1 1/2"	4'	3'
2"	5'	4'
2"	6'	2'-6"
2"	7'	2'

(1) For concrete joist construction only—where a 10-gauge wire may be inserted in the joist before the concrete is poured.

span of lath between cross furring

type of lath	max. span of lath
Diamond Mesh	3.4 lbs./sq. yd.
1/8" Z-Riblath	3.4 lbs./sq. yd.
3/8" Riblath	3.4 lbs./sq. yd.

fire ratings

column fireproofing

test no.	fire rating
BMS-92 table 40	1 hr.
UL Des X402 (was 2-2 hr)	2 hr.
UL Des X402 (was 6-3 hr)	3 hr.
UL Des X402 (was 6-4 hr)	4 hr.
UL Des X406 (was 7-4 hr)	4 hr.
UL Des X405 (was 3-4 hr)	4 hr.

column fireproofing

In these assemblies USG Metal Lath, plain or self-furring, is wire-tied in place around structural steel columns and plastered with gypsum plasters to provide lightweight, thin, compact fireproofing. USG Self-Furring Diamond Mesh Metal Lath utilizes a dimpled design to hold the lath away from the column and allow mechanical keying of the plaster. Plain USG Diamond Mesh Metal Lath furred from the column with ¾-in. cold-rolled channels is an alternate method of construction which can be extended to enclose and protect adjacent ducts and other mechanical components. Fire protection afforded depends on type of metal lath, type and proportioning of aggregate to gypsum plaster, and plaster thickness (see table, page 4).

Component parts in these systems are noncombustible. In addition, gypsum calcines slowly, retarding flame and resisting heat transfer by giving up its chemically combined water of crystallization. The aggregate acts as a bulking agent for the plaster, and some types serve additionally as an insulating material against heat transfer. For example, lightweight aggregates provide more fire resistance than sand.

These thin, lightweight plaster assemblies reduce dead load and save floor area. The plaster surface provides the base for final decoration. Increased fire protection of primary structural framing member usually permits lower insurance premiums. To resist impact damage from cartage equipment, etc., metal reinforcement must be provided at column corners.

column fireproofing plaster requirements

fire resistance rating	plaster thickness	proportioning	type of aggregate
1 hr.	3/4"	100:2-100:3	perlite
2 hr.	1"	100:2-100:3	perlite
3 hr.	1 1/8"	100:2-100:3	perlite
4 hr.	1 1/4"	STRUCTO-LITE Plaster or 100:2-100:3	mill-mixed or perlite
4 hr.	1 1/2"	100:2-100:3	perlite
4 hr.	1 1/8"	STRUCTO-LITE Plaster	mill-mixed

specifications

notes to architect

1. All fire-rated partitions require TRUSSTEEL Stud attachment to TRUSSTEEL or Snap-In Runner Track by TRUSSTEEL Stud Shoes at the ceiling.

2. Snap-In Runner Track with studs cut accurately to length may be used for a floor and ceiling attachment where construction is non fire-rated. This track may be used at the floor on fire-rated partitions.

3. Metal door and borrowed-light frame material should be at least 16-ga. steel, shop primed, with throats accurately formed to overall thickness of partition. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Provide four jamb anchor inserts in each jamb, welded to trim returns.

Grouting and additional reinforcement at the jamb are recommended for all door frames and are required for heavy (over 50 lbs. with hardware) or oversize doors which also require use of door closers and bumpers. Grout should be raked out to allow insertion of lath and plaster into frame; lath and plaster must not terminate against trim.

4. Plaster base surfaces should be isolated with control joints or other means where: (a) partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling; (b) a ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration; (c) construction changes within the plane of the partition or ceiling; (d) partition or furring run exceeds 30'; (e) ceiling dimension exceed 50' in either direction; (f) exterior soffit dimensions exceed 25' in either direction with gypsum plaster and 10' in either direction with portland cement stucco; (g) expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.

5. Penetrations of the lath and plaster diaphragm, such as door frames, borrowed-light openings, vents, grilles, access panels and light troffers, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.

6. Where a plaster surface is flush with metal, metal bucks, metal windows, metal access panels or light troffers, the plaster should be grooved between the two materials.

7. **Fixture Attachment**—Lightweight fixtures and trim should be installed using plastic plugs or other expandable anchors for screw attachment.

Wood inserts for fixture attachment must always be wire-tied to inside of stud chords to prevent breaking up stress skin of lath and plaster.

8. **Ceramic Tile**—Where ceramic tile is required, a portland cement-lime plaster may be applied in scratch and brown coats to 5/8" grounds over metal lath as a base. Ceramic tile may also be adhesively attached over the finished gypsum plaster in accordance with adhesive manufacturer's specifications.

9. Where these assemblies are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cutouts, such as at electrical boxes, and at the perimeter of the partition and ceiling. Back-to-back penetrations of the diaphragm and flanking should be avoided. Use sand aggregate only. Door openings are not recommended in sound control partitions.

10. Plenum or attic space closed by ceiling installation should be vented with a min. 1/2 sq. in. net free vent area per sq. ft. of horizontal surface.

11. Gypsum plaster can be satisfactorily used with radiant heat ceilings; see U.S.G. Technical Brochure P-480.

12. Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.

13. See U.S.G. technical product folders on Gypsum Plasters, Bases & Accessories for general lathing and plastering specifications; Paint Products for paint specifications.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather, all glazing shall be completed and the building heated to a minimum of 55°F. before lathing. Ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

- a. TRUSSTEEL Runner Track—widths 1 1/8", 2 1/2", 3 1/4", 4", or 6" (see Note 2, above).
- b. TRUSSTEEL Snap-In Runner Track—widths 1 1/8", 2 1/2", 3 1/4" 4" (see Note 2, above).
- c. TRUSSTEEL Studs—widths 1 1/8", 2 1/2", 3 1/4", 4", or 6" (see Note 1, above).
- d. TRUSSTEEL Stud Shoes.
- e. USG Corner Bead No. (1-A).
- f. USG Casing Bead No. 66.
- g. USG Cold-Rolled Channels 3/4", 1 1/2".
- h. SUPER-TITE Clip.
- i. Tie Wire (16) (18)-ga.
- j. Hanger Wire (8) (9) (10)-ga.
- k. USG Metal Lath—3.4-lb. (self-furring) (Diamond Mesh) (Z-Riblath) (Poly-backed Diamond Mesh) (3/8" Riblath) 27" x 96".
- l. USG Adjustable Wall Furring Bracket.
- m. USG Control Joint No. 75.
- n. USG Acoustical Sealant.

Part 3: execution

3.1 stud system erection

Install TRUSSTEEL Studs of the size shown on the plans or as herein specified, spaced max. 16" o.c. Accurately align all partitions according to the partition layouts.

Securely attach runner tracks:

- 1. **To concrete slabs**—Using concrete stub nails or power-driven anchors, spaced max. 24" o.c.

2. To ceiling grillage—Wire-tie, using a double strand of 18-ga. tie wire, spaced max. 24" o.c.

3. To plaster or gypsum base—Toggle bolt or wire tie, spaced max. 24" o.c.

Place studs, cut to nominal ceiling height, vertically into and resting upon floor runner track. Top of studs can be no more than $\frac{3}{8}$ " from ceiling with Snap-In Track; no more than 3" from ceiling with TRUSSTEEL Runner Track.

Secure studs to Snap-In Track by twisting until studs engage notches in both floor and ceiling tracks; to TRUSSTEEL Track with TRUSSTEEL Stud Shoes, crimped or wire-tied with double-strand 18-ga. wire. Secure studs adjacent to door and borrowed-light frames with two wire ties of double-strand 18-ga. wire.

3.2 wall furring erection

On partitions designated as vertical furring, bridge back chord of TRUSSTEEL Stud using continuous $\frac{3}{4}$ " channels at third points or not to exceed 48" o.c. and at mid-height. Saddle-tie channels to each stud.

On braced furring, securely attach mid-point bridging channel to masonry back-up with USG Adjustable Wall Furring Brackets 32" o.c.

Install USG Adjustable Wall Furring Brackets, with crimped edges up using (one 2" cut nail in mortar joints or brick, clay tile, or concrete block or in field of lightweight aggregate blocks) ($\frac{5}{8}$ " concrete stub nails or power-driven nails or other suitable fasteners in monolithic concrete) driven through top hole of bracket. Apply brackets to masonry walls at mid-height of furred wall and space not over 4" from columns or other abutting construction and not over 32" o.c. horizontally and 48" o.c. vertically, and as required above and below windows. Lay mid-height furring channel horizontally on furring brackets with legs down, and wire-tie to bracket with double-strand 18-ga. tie wire. Bend excess bracket length down.

3.3 door frames

Insert studs into steel door frame engaging notches of jamb anchor clips, and securely wire-tie each chord of stud to jamb anchor. Install second stud each side of door frame, approximately 2" from strut stud.

Install two $\frac{3}{4}$ " cold-rolled channels over head of door, extending out to engage third stud on each side. For heavy oversize doors, install additional horizontal reinforcing channels in pairs each side of door jamb and position 8" from head and floor and at mid-height. Securely tie these aligning channels to inside of stud chord at each intersection.

3.4 ceiling grillage erection

Note: Select hanger, main runner and furring types and spacing from Tables, page 0. Space (8) (9) (10)-ga. hangers not over (2') (3') (3'6") (4') (5') (6') (7') in direction of main runner channels, not over (2') (2'6") (3') (3'6") (4') at right angles to main runners and within 6" of ends of main runner runs and of boundary walls, girders or similar interruptions of ceiling continuity. In concrete, anchor hangers by attachment to reinforcing steel, by loops embedded at least 2" or by approved inserts. For steel supports, wrap hanger around beams or joists.

Install (1 $\frac{1}{2}$) (2") main runner channels spaced not over (2') (2'6") (3') (3'6") (4') o.c., properly positioned, leveled and

secured to hanger wire saddle-tied along channel. Locate channels within 6" of walls to support furring channel ends.

Erect cross furring channels at right angles to main runners or framing. Space channels (16") (19") (24") o.c. and securely saddle-tie to main runners or steel joists with double-strand 16-ga. tie wire. Saddle-tie hangers from concrete joists to furring channels.

Provide 1" clearance between ends of main runners and furring channels and abutting masonry walls. At channel splices, overlap ends at least 8" and secure with double-strand 16-ga. tie wire 1" from each end.

At light troffers or any opening that interrupts the main runner or furring channels, install additional cross reinforcing to restore lateral stability of grillage.

3.5 plaster base attachment

Apply lath with long dimension across supports and with end joints staggered in adjacent rows. Lap ends at least 1" and sides of diamond mesh lath at least $\frac{1}{2}$ ". Lap sides of riblath by nesting outside ribs. At all interior angles form metal lath into corners and carry out onto abutting surface.

Secure diamond mesh lath to TRUSSTEEL Studs with SUPER-TITE clips at intervals not exceeding 6"; where sheets overlap, use 18-ga. tie wire. Secure metal lath to other supports with 18-ga. tie wire at intervals not exceeding 6". Securely tie end laps between supports with 18-ga. tie wire.

Secure riblath to all supports with 18-ga. tie wire. Between supports, wire-tie sheets together at intervals not exceeding 9".

3.6 steel beam fireproofing

Form framework of $\frac{3}{4}$ " channels or pencil rods, as shown on the drawings. Space $\frac{3}{4}$ " longitudinal furring brackets not more than 36" o.c.; space brackets formed of pencil rods not more than 19" o.c.

Without longitudinal furring bracket, spacing is limited to 16" for 3.4-lb. diamond mesh lath and a minimum of one longitudinal channel is required to hold bracket alignment. Install grounds to insure required plaster thickness shown on drawings.

3.7 steel column fireproofing

Form self-furring Diamond Mesh Lath neatly around the column and wire-tie not over 6" o.c. at laps. Alternate: Install $\frac{3}{4}$ " channel spacers or furring brackets (as required for fire ratings) and studs as shown to provide required chase. Tie diamond mesh lath to channels with 18-gauge tie wire. Wire-tie USG 1-A Corner Bead to metal lath corners to provide plaster grounds shown.

3.8 accessory application

a. Metal Corner Bead—Provide on all external plaster corners in single lengths whenever possible. Fasten securely with wire-ties spaced 8" o.c. max.; stagger in two wings.

b. Casing Bead—Install where indicated to provide full plaster grounds. Cut and miter ends accurately. Wire-tie in place.

c. Control Joint—Provide as detailed and where indicated. Wire-tie in place.

d. Reinforcing—Install a strip of self-furring diamond mesh lath over joints between dissimilar plaster bases.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG TRUSSTEEL, SUPER-TITE, THERMAFIBER, STRUCTO-LITE.

thin reveal type frame

flush type

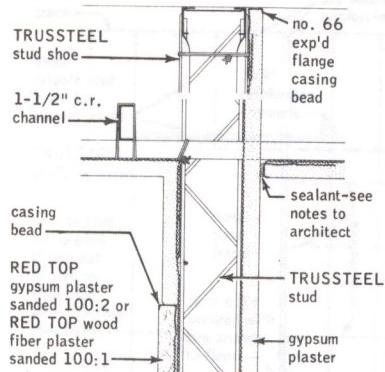
reveal type

reinforced jamb

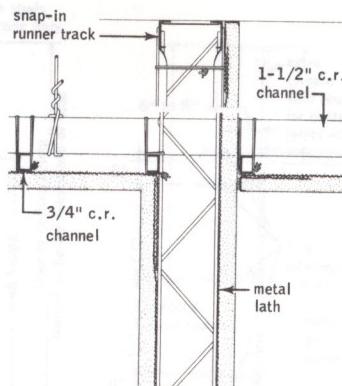
details/partitions & ceilings

scale: 1 1/2" = 1'-0"

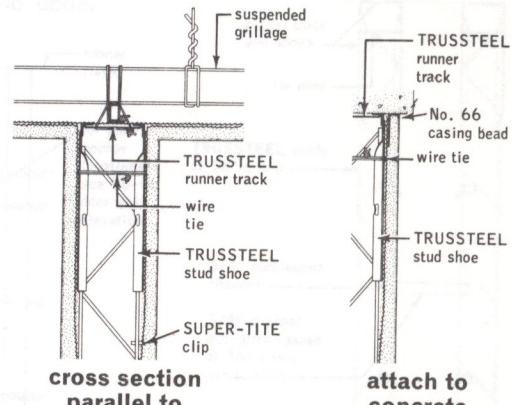
ceiling attachments



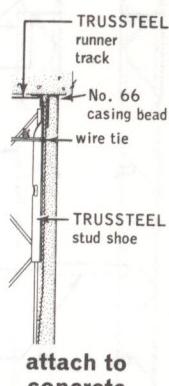
cross section transverse to furring channel



cross section parallel to furring channel

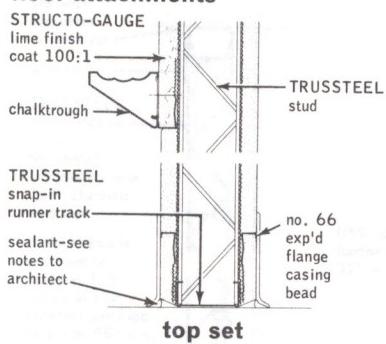


cross section parallel to furring channel

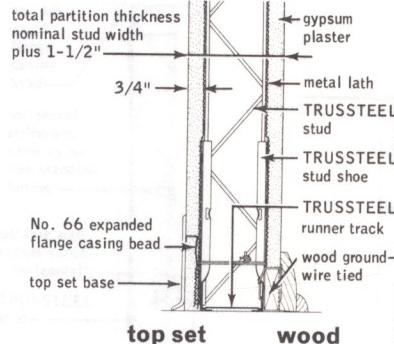


attach to concrete ceiling slab

floor attachments

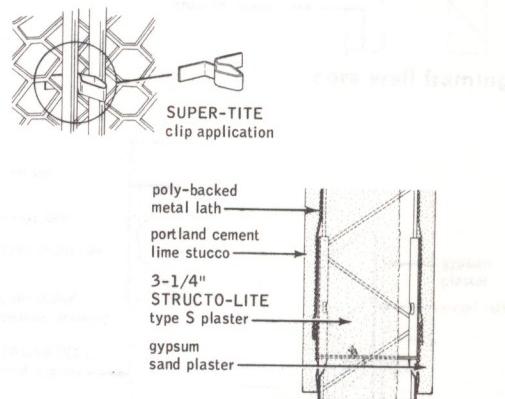


top set



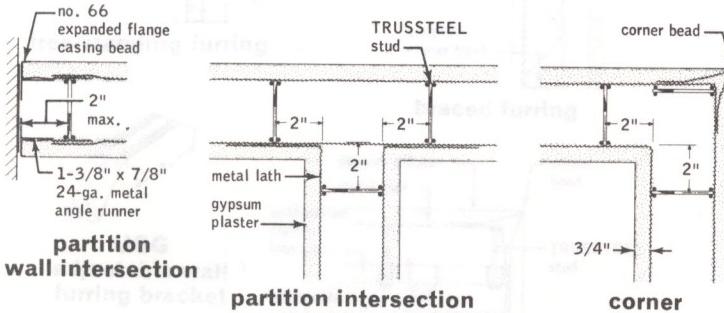
top set

wood



4-hr. UL Design U402

intersecting partitions

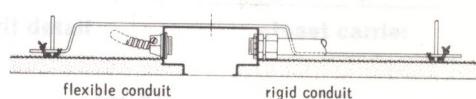


partition wall intersection

partition intersection

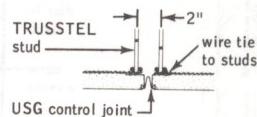
corner

electrical outlet

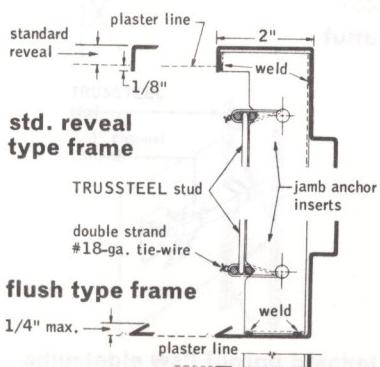


flexible conduit rigid conduit

wall control joint



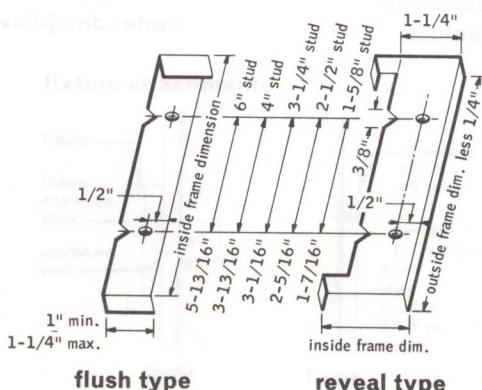
door frame jamb anchor inserts/quarter size



std. reveal type frame

flush type frame

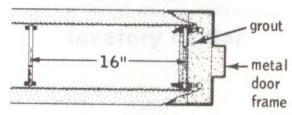
thin reveal type frame



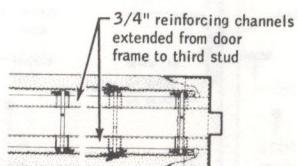
flush type

reveal type

jamb sections



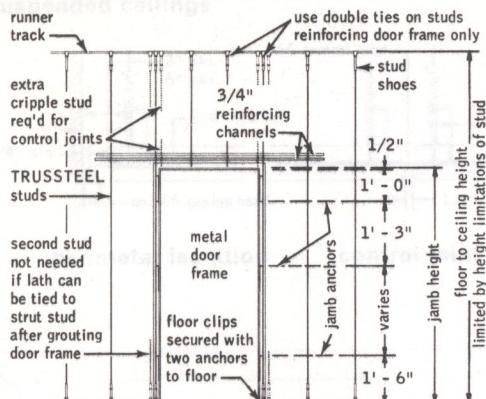
direct attachment



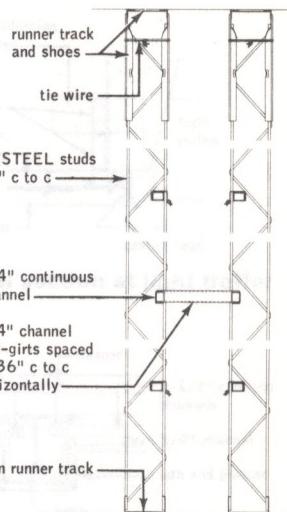
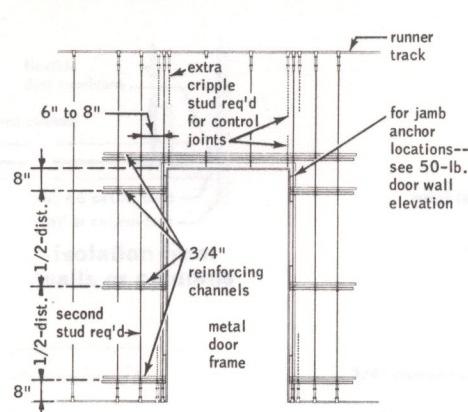
reinforced jamb

details/miscellaneous

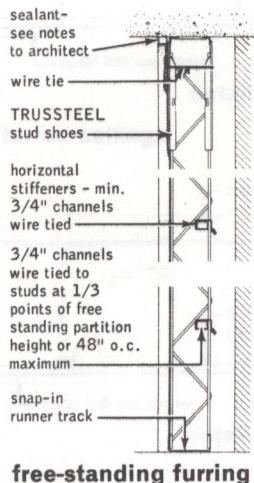
wall elevation — 50-lb. doors



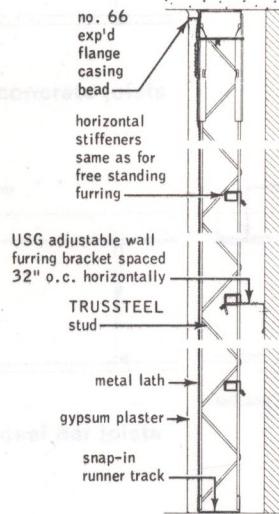
wall elevation — 50 to 200-lb. doors



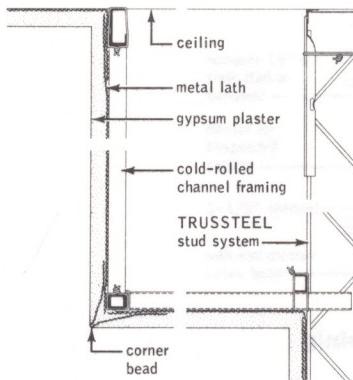
core wall framing



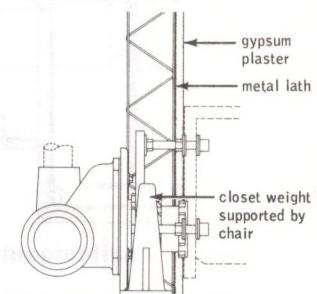
free-standing furring



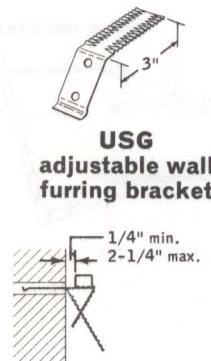
braced furring



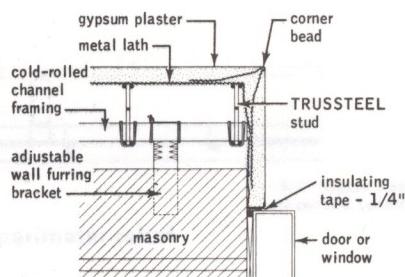
soffit detail



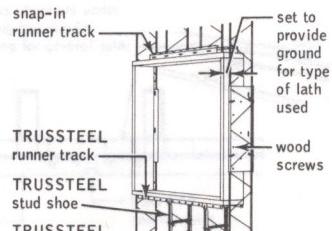
closet carrier



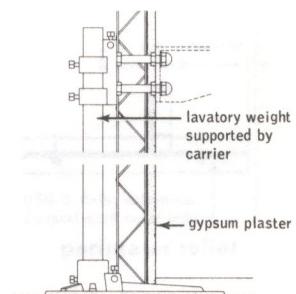
**USG
adjustable wall
furring bracket**



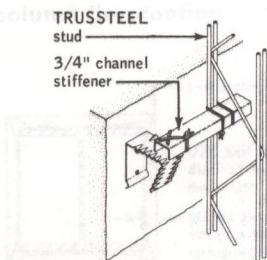
furred wall-jamb return



**borrowed light or
cabinet frame**

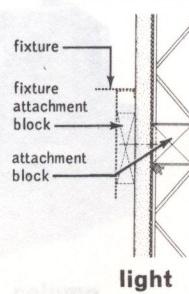


lavatory carrier

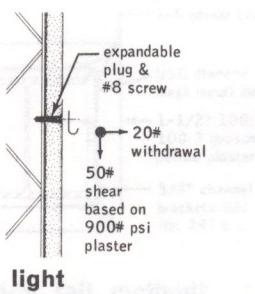


**adjustable wall furring bracket
and attachments**

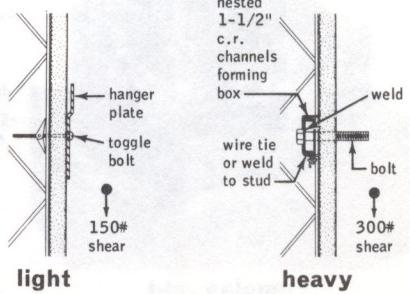
fixture attachments



light



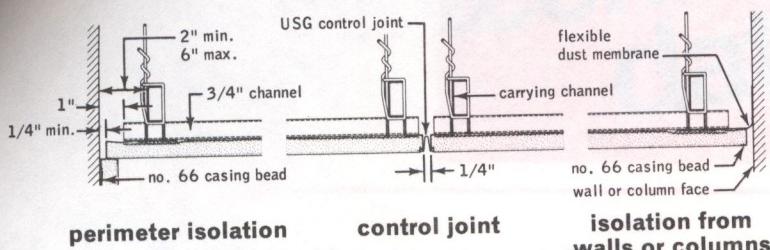
light



heavy

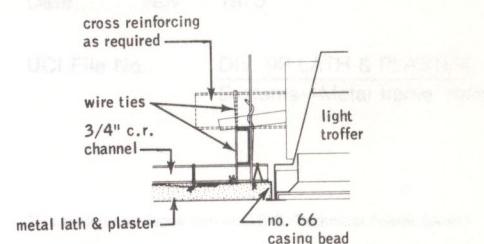
details/miscellaneous

suspended ceilings

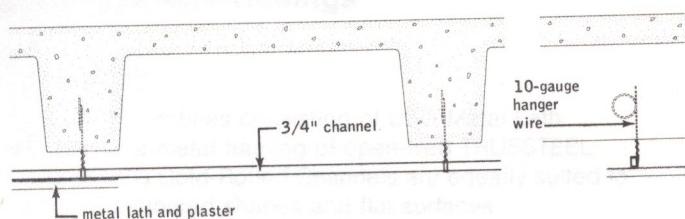


Reprint No. CS-6

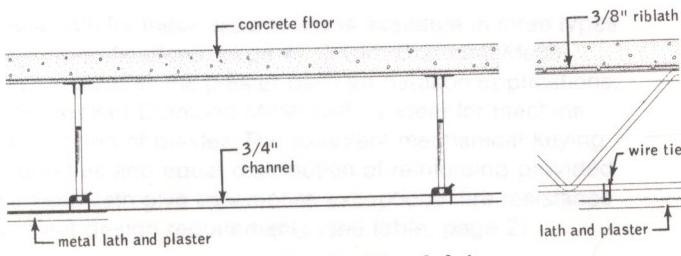
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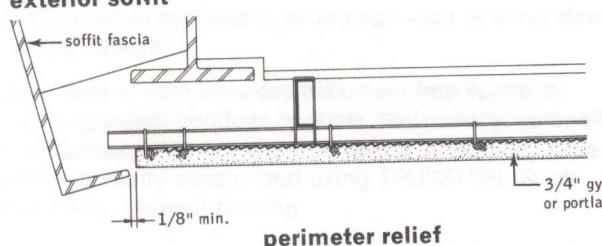
vertical section at light troffer



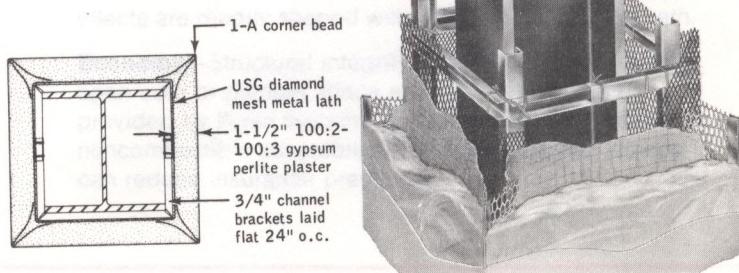
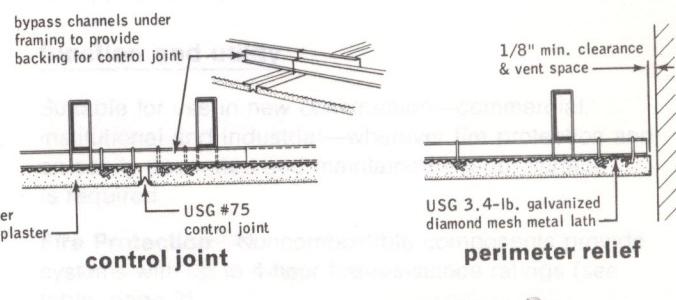
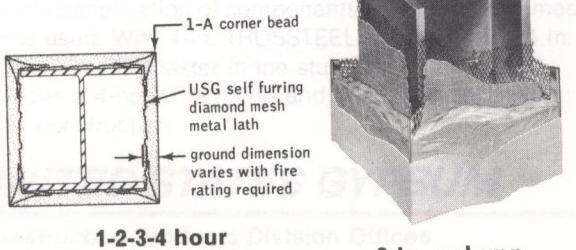
furred ceilings



exterior soffit



column fireproofing



INCORPORATING FORMER U.S.G. FOLDER SA-918

description and utility

UNITED STATES GYPSUM produces the industry's broadest and best-known line of plasters, bases, metal structural members and lathing accessories. From these have been engineered dozens of partition, ceiling and wall furring assemblies, each of which provides different characteristics of structural stability, fire resistance and sound transmission loss. Performance and specification of these assemblies are covered in individual U.S.G. System Folders, which are keyed in turn to the U.S.G. Construction Selector index.

Basic information on the plastering components available for such assemblies is included here. Proper use of U.S.G. plaster bases and plasters provides the secure bond necessary to develop strength and resistance to abuse and cracking. A "mechanical" bond is formed when plaster is pressed through the mesh of metal lath, forming keys on the back side. A "suction" bond is formed when gypsum plaster is applied over gypsum lath and masonry bases; the tiny needle-like plaster crystals penetrate into the surface pores of the base by suction.

Bases and accessories are covered in this catalog in six groups: (1) Gypsum Plaster Bases; (2) USG Metal Lath; (3) PYROBAR Partition Tile; (4) USG Corner Beads, Trim, Control Joints; (5) USG Lath Attachment Clips and Screws; (6) USG Structural Accessories.

Plastering products are covered in three classifications, starting on page 7: (7) Veneer Plasters, (8) Basecoat Plasters, (9) Finish Coat and Gauging Plasters and Finishing Limes.

Descriptions, uses, properties and limitations are shown for each product. General lathing and plastering specifications appear on pages 10 to 12.

For the beauty and durability of which plaster is capable, rigid requirements should be followed as to number of coats applied. Three-coat work is mandatory on all metal lath, and on edge-supported gypsum lath used in ceilings; three-coat work is desirable on all gypsum lath; two-coat work is acceptable on gypsum lath when properly supported, and masonry plaster bases. Exceptions are noted below for IMPERIAL Veneer Plasters.

In the preparation of plastering specifications, consideration should be given to the selection of materials not only for compatibility, but for the *quality* of the structure to be plastered. Since ANSI and AIA specifications are based on minimum standards, they should be followed only in applications where minimum plastering quality is desired. It is wise to upgrade plastering specifications wherever possible.

Plastering Performance Selector—Following are general recommendations listed in the order of preference—No. 1 in each case being expected to produce the highest quality results:

Basecoat Plaster (over metal lath)

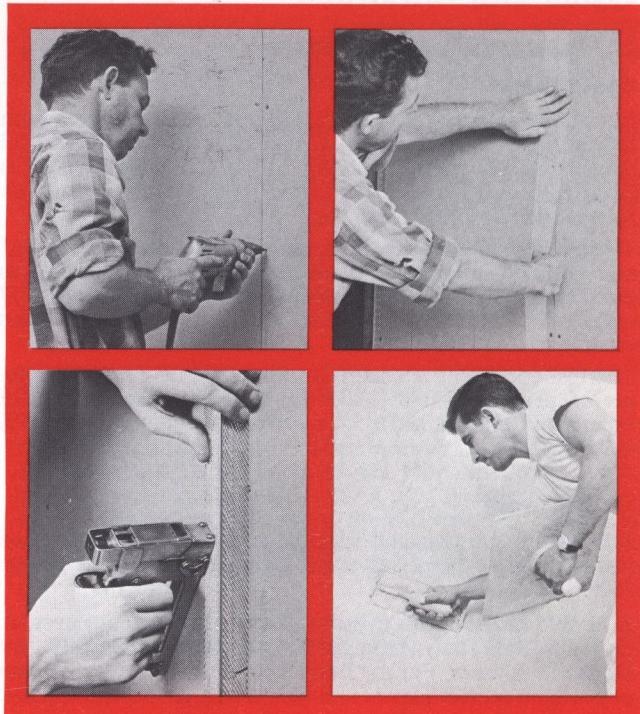
Scratch Coat

1. STRUCTO-BASE(1)
Plaster, sanded 100:2
2. Wood Fiber, neat, or
sanded up to 100:1
3. Wood Fiber, neat, or
sanded up to 100:1
4. RED TOP Gypsum Plaster,
sanded 100:2
5. Wood Fiber, neat, or
sanded up to 100:1
6. Wood Fiber, neat, or
sanded 100:1

Brown Coat

- STRUCTO-BASE
Plaster, sanded 100:3
- Wood Fiber,
sanded up to 100:1
- RED TOP Gypsum Plaster,
sanded 100:2
- RED TOP Gypsum Plaster,
sanded 100:3
- STRUCTO-LITE Plaster
(sand float finish only)
- RED TOP Gypsum Plaster,
perlited 100:2
(sand float finish only)

(1) Verify availability with your local U.S.G. sales representative.



Basecoat Plaster (over gypsum lath)

See "Use of Aggregates" table, page 8.

Aggregates

- | | |
|-----------------------|--------------------------|
| 1. Sand | 3. Job-mixed Perlite |
| 2. Mill-mixed Perlite | 4. Job-mixed Vermiculite |

Note: Lightweight aggregates should not be used on a construction where sound isolation is a consideration.

Veneer Plasters (over veneer base)

1. IMPERIAL Basecoat and Finish Plaster
(two-coat system)
2. IMPERIAL Basecoat and other appropriate finish
(two-coat system)
3. IMPERIAL Finish Plaster (one-coat system)
4. DIAMOND Interior Finish (one-coat system)

Finish Coats

Float Finishes

1. IVORY Lime (92% hydrate), Keenes Cement and white silica sand
2. GRAND PRIZE or RED TOP Lime, RED TOP Gauging and white silica sand

Smooth Trowel Finishes

1. IVORY Lime and STRUCTO-GAUGE Plaster
2. IVORY Lime, RED TOP Gauging, with 1/2 cu. ft. of perlite fines or fine silica sand
3. IVORY Lime and Keenes Cement
4. GRAND PRIZE or RED TOP Lime, and RED TOP Gauging Plaster

Note: Float Finish 1 and Trowel Finish 2 (except over metal lath) are the only finishes recommended for use over a basecoat containing lightweight aggregate. Smooth Trowel Finishes 1 and 3 provide high abrasion resistance and because of their hardness must be used over a comparably hard basecoat.



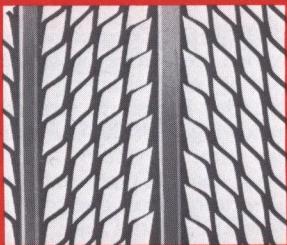
USG Junior Diamond Mesh Lath



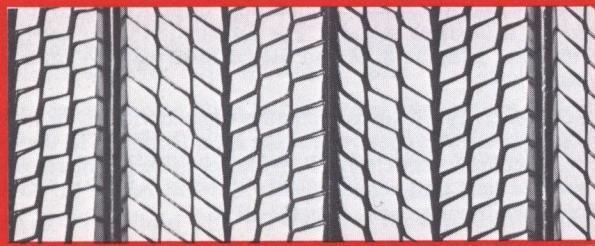
USG Self-Furring Diamond Mesh Lath



USG Poly-Backed Metal Lath



USG 4-Mesh Z-Riblath



USG 3/8" Riblath

2. USG Metal Lath

description

USG metal lath is sheet steel that has been slit and expanded to form a multitude of small mesh openings. It is made in Diamond Mesh, Riblath and Stuccomesh types and in two different weights for each style. They are manufactured from galvanized or rust-resisting copper alloy steel, further protected by a coating of black asphaltum paint. Comply with Federal Specification QQ-L-101C.

USG Junior Diamond Mesh Lath is a small diamond mesh metal plaster base (approx. 11,000 meshes per sq. yd.). A general all-purpose lath, best for ornamental, contour plastering. The small meshes conserve plaster and reduce droppings. Available painted and galvanized.

Also available in self-furring type having $\frac{1}{4}$ " "dimple" indentations spaced $1\frac{1}{2}$ " o.c. each way for use as exterior stucco base, column fireproofing and for replastering over old surfaces. **Size:** 27" x 96". **Weights:** 2.5 lbs. (end painted white) and 3.4 lbs. (end painted red) per sq. yd.

USG Poly-Backed Metal Lath is painted or galvanized Junior Diamond Mesh Lath with 1-mil clear polyethylene factory-bonded to the back. Ideal for machine-applied stucco in curtain walls and for plaster in interior partitions. **Size:** 27" x 96". **Weight:** 2.5 lbs. and 3.4 lbs. per sq. yd.

USG 4-Mesh Z-Riblath is a "flat rib" type of lath with smaller mesh openings, suitable for "double-up" type of plastering. An excellent nail-on lath, or for tie-on work on

flat ceilings. **Size:** 27" x 96". **Weights:** 2.75 lbs. (end painted white) and 3.4 lbs. (end painted red) per sq. yd. **Limitation:** not for contour or resilient work; Diamond Mesh preferred.

USG $\frac{3}{8}$ " Riblath comes in a herringbone mesh pattern with $\frac{3}{8}$ " V-shaped ribs running lengthwise of the sheet at $4\frac{1}{2}$ " intervals, with inverted intermediate $\frac{3}{16}$ " ribs. The heavy ribs provide exceptional rigidity. Used when supports are spaced more than 16" o.c. and for 2" solid studless metal lath and plaster partitions. Also used as a centering lath for concrete floor and roof slabs. Available painted and galvanized. **Size:** 27" x 96" (other lengths available). **Weights:** 3.4 lbs. (end painted red) and 4.0 lbs. (end painted yellow) per sq. yd. **Limitation:** its extreme rigidity makes $\frac{3}{8}$ " Riblath unsuitable for contour plastering or resilient application—use Diamond Mesh Lath; due to $\frac{3}{8}$ " rib, minimum ground thickness must be 1".

USG Expanded Metal Stuccomesh is a $1\frac{3}{8}$ " x $3\frac{1}{8}$ " diamond mesh pattern designed as a base for exterior stucco, hand or pump applied. **Size:** 48" x 99". **Weight:** 3.6 lbs. per sq. yd. **Limitations:** should be applied with $1\frac{1}{2}$ " galvanized self-furring nails; when used over sheathing other than wood, fasten with longer nails providing minimum penetration of $1\frac{1}{8}$ " into studs.

3. PYROBAR Gypsum Partition Tile

description

PYROBAR is a precast, kiln-dried gypsum tile for building non-load bearing fireproof partitions. Made in 12" x 30" size, in three thicknesses with indented surfaces, in types as follows:

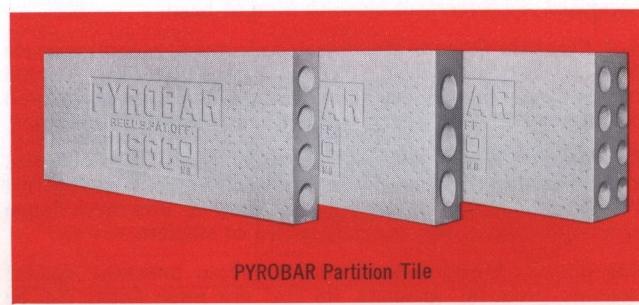
- 3" Hollow for column & vent shaft fireproofing
- 3" Hollow, 4" Hollow and 6" Hollow, all for partitions and column fireproofing

Complies with ASTM C52 and Fed. Spec. SS-T-316C.

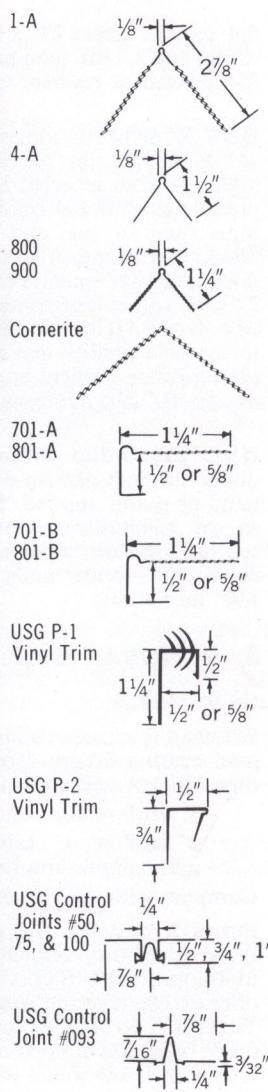
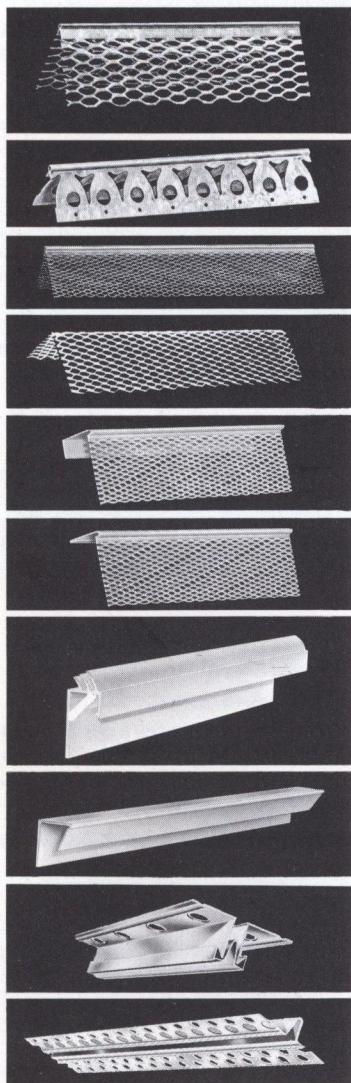
PYROBAR provides the greatest fire protection per inch of thickness of any commercial partition assembly; fire ratings up to 4 hours (see U.S.G. Construction Selector). Partitions also offer excellent sound isolation—up to 56 STC—at a low cost. Tile is 30% to 50% lighter than other commonly used masonry units. Machine molded units lay accurately to form level surface with fewer joints which require less plaster and mortar than other types; easily cut, handled and maintained; ideal for tenant office renovations.

limitations

1. For use only in non-load bearing constructions.
2. Portland cement and lime mortars do not bond adequately with PYROBAR. RED TOP Partition Tile Cement should be used.
3. Portland cement or lime plasters cannot be used over PYROBAR. RED TOP Gypsum Plaster should be used.
4. PYROBAR must be protected by a continuous coating of asphaltic material prior to any contact of wet flooring or base material with the face of the tile.



PYROBAR Partition Tile



4. USG Corner Beads, Trim, Control Joints

description

USG Corner Beads and Trim, made from top-quality galvanized steel, enjoy the industry's top acceptance because of their dependability and continual improvement in design. Corner beads (26-ga.) are available in 8 and 10-ft. lengths, metal trim (30-ga.) in 7 and 10-ft. lengths, casing beads (24-ga.) in 7, 8 and 10-ft. lengths.

1-A Expanded Corner Bead has wide expanded flanges that are easily flexed. Preferred for irregular corners. Provides increased reinforcement close to nose of bead.

4-A Flexible Corner Bead is an economical general purpose bead. By snipping flanges, this bead may be bent to any curved design (for archways, telephone niches, etc.). Can be secured to corners with 9-A Corner Bead Clips attached to flanges.

800 Corner Bead gives $\frac{1}{16}$ " grounds needed for one-coat veneer finishes. Approx. 90 keys per lin. in. provide superior bonding and strong, secure corners. The $1\frac{1}{4}$ " fine-mesh flange eliminates shadowing, is easily nailed or stapled.

900 Corner Bead is used with two-coat IMPERIAL Plaster systems, gives $\frac{3}{32}$ " grounds. Its $1\frac{1}{4}$ " fine-mesh flange can be

either stapled or nailed. Provides superior plaster key and eliminates shadowing.

Cornerite and Striplath are strips of painted copper alloy Diamond Mesh Lath used as reinforcement. Selv-edge Cornerite is bent lengthwise in the center to form a 100° angle. It should be used in all interior angles where metal lath is not lapped or carried around, over non-ferrous lath anchored to the lath, and over internal angles of masonry constructions to reduce plaster cracking. Also available galvanized. Sizes: $2'' \times 2'' \times 96''$ and $3'' \times 3'' \times 96''$. Striplath is a similar flat strip, used as a plaster reinforcement over joints of non-metallic lathing bases and where dissimilar bases join; also to span pipe chases. Size: $4'' \times 96''$.

USG Metal Trim comes in two styles and two grounds to provide neat edge protection for veneer plastering at cased openings and ceiling or wall intersections. All have fine-mesh expanded flanges to strengthen plaster bond and eliminate shadowing. No. 701-A, channel-type, and No. 701-B, angle edge trim, provide $\frac{3}{32}$ " grounds for two-coat systems. No. 801-A, channel-type, and No. 801-B, angle edge trim, provide $\frac{1}{16}$ " grounds for one-coat systems. Sizes: for $\frac{1}{2}$ " and $\frac{5}{8}$ " IMPERIAL Gypsum Base.

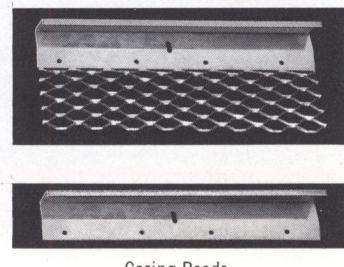
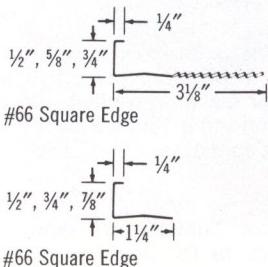
USG P-1 Vinyl Trim is a channel-shaped rigid trim with flexible vinyl fins which compress on installation to provide a positive acoustical seal comparable in performance to one bead of acoustical sealant. For IMPERIAL Plaster partition perimeters. Length: 8, 9 and 10 ft. Sizes: for $\frac{1}{2}$ " and $\frac{5}{8}$ " gypsum base.

USG P-2 Vinyl Trim is a channel-shaped vinyl trim with a pressure-sensitive adhesive backing for attachment to the wall at wall-ceiling intersections. Provides positive perimeter relief in radiant heat and veneer plaster systems. Allow $\frac{1}{8}$ " to $\frac{1}{4}$ " clear space for insertion. Length: 10 ft.

USG Control Joint relieves stresses of expansion and contraction in large plastered areas. Made from roll-formed zinc, it is resistant to corrosion in both interior and exterior uses with gypsum or portland cement plaster. An open slot, $\frac{1}{4}$ " wide and $\frac{1}{2}$ " deep, is protected with plastic tape which is removed after plastering is completed. The perforated short flanges are wire-tied to metal lath or stapled to gypsum lath. Thus the plaster is keylocked to the control joint, which not only provides plastering grounds but can also be used to create decorative panel designs. **Limitations:** Where sound and/or fire ratings are prime considerations, adequate protection must be provided behind the control joint. USG Control Joints should not be used with magnesium oxychloride cement stuccos or stuccos containing calcium chloride additives. **Sizes and grounds:** No. 50, $\frac{1}{2}$ "; No. 75, $\frac{3}{4}$ "; No. 100, 1" (for use with exterior stucco curtain walls)—10-ft. lengths.

USG Control Joint No. 093 applies the same functions of the regular control joint (above) to veneer plaster installations. Made of zinc, with $\frac{3}{32}$ " ground dimension and a tape-protected $\frac{1}{4}$ " opening $\frac{7}{16}$ " deep. Used from floor to ceiling in long partition runs, and from header to ceiling above door frames. Lengths: 8 and 10 ft.

USG Casing Beads are used as a plaster stop and as exposed trim around window and door openings; also recommended



Casing Beads

at junction or intersection of plaster and other wall or ceiling finishes. May be used with USG metal lath, ROCKLATH gypsum plaster base, or masonry construction. In order to insure proper grounds for plastering, $\frac{3}{4}$ " casing beads are recommended for use with metal lath, $\frac{5}{8}$ " beads with all masonry units, $\frac{7}{8}$ " beads when the flange is applied *under* ROCKLATH plaster base, $\frac{1}{2}$ " beads when the flange is applied *over* ROCKLATH. Available in #66 Square Edge with $1\frac{1}{4}$ " solid or $3\frac{1}{8}$ " expanded flange. Expanded flange type also comes in $\frac{1}{2}$ " and $\frac{3}{4}$ " beads, 10-ft. lengths, made from zinc alloy for exterior applications.

IMPERIAL Tape is a special $2\frac{1}{2}$ " wide glass fiber lino-weave tape designed to reinforce joints of large-size IMPERIAL and USG R.H. bases prior to finishing with the veneer plasters of those systems. Open weave of tape allows rapid air escape during plaster embedding; highly crack resistant. Two types: P, pressure-sensitive, and S, staple-attached.

5. USG Lath Attachment Accessories

description

A complete line of specially formed steel clips and self-drilling steel screws provides positive attachment and rapid erection of USG gypsum plaster bases and metal lath. Variations are used with different U.S.G. partition and ceiling systems.

BRIDJOINT Field Clip B-1 is used to support and align end joints of ROCKLATH which do not fall opposite structural members; sizes for both $\frac{3}{8}$ " and $\frac{1}{2}$ " lath.

BRIDJOINT Corner Clip B-2 is used in conjunction with B-1 clips to eliminate nailing in corners and angles; also when ceilings are resilient and walls nailed direct and vice versa. For $\frac{3}{8}$ " ROCKLATH Plaster Base only.

BRACE-TITE Field Clip BT-1 is used for suspended ceilings, exterior wall and beam furring and hollow pipe chase partitions. Provides support across full width of lath. For use with standard $\frac{3}{4}$ " cold-rolled channels spaced 16" o.c.

BRACE-TITE Starter Clip BT-1 is used in conjunction with BT-1 field clip to start first course of lath.

TRUS-LOK Field Clip TL-1 is designed for attaching $\frac{3}{8}$ " ROCKLATH Plaster Base to TRUSSTEEL Studs.

TRUS-LOK Starter Clip TL-2 is used with TL-1 clips, MS-1 clips and runner track to start first course of lath.

TRUS-LOK Drive-In Clip is used to anchor (1) bottom course of lath in direct attachment to TRUSSTEEL Studs or USG Steel Studs, and (2) top course of lath in partitions to underside of monolithic concrete flat slab or concrete joist filler construction; also as starter-finisher clip in steel stud-ROCKLATH partition.

MS-1 Clip provides quick direct attachment of $\frac{3}{8}$ " ROCKLATH to channel-type USG Steel Studs. Clip is slipped behind stud flange and down over lath.

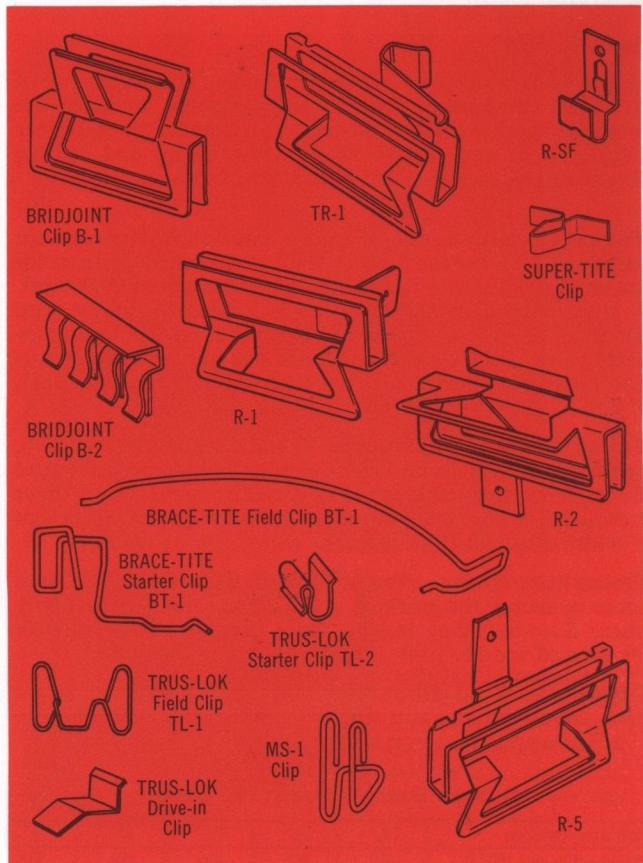
Resilient Clip TR-1 attaches $\frac{3}{8}$ " ROCKLATH to TRUSSTEEL Studs spaced 16" o.c., furs lath $\frac{3}{8}$ " from stud face.

Resilient Starter-Finisher Clip R-SF is used with starting and last courses of resiliently attached ROCKLATH Plaster Base on wood studs or TRUSSTEEL snap-in runner track.

SUPER-TITE Clip, applied with a special gun, firmly attaches diamond mesh lath to TRUSSTEEL Studs (see page 6).

Resilient Clip R-1, for wood studs or joists spaced 16" o.c., is attached by nailing with 13-ga., $1\frac{1}{8}$ " lathing nail. ROCKLATH is floated $\frac{3}{8}$ " free of framing members and held in place by prongs of clip. Resiliently attached ROCKLATH ceilings require three-coat plastering.

Resilient Clip R-2 is for internal angles of wood frame con-



struction when both surfaces are resiliently furred. Furs lath $\frac{3}{8}$ " from framing.

Resilient Clip R-5 is for masonry walls or face attachment over sound deadening board. ROCKLATH is resiliently furred $\frac{1}{2}$ " from face.

USG Brand Screws are recommended for attachment of large-size IMPERIAL and USG R.H. Base, as well as of ROCKLATH Plaster Base in certain applications. Twenty-five different self-drilling, self-tapping steel screws are used in plastering systems, applied by power-driven screw gun. They comply with ASTM C646. Applications are listed below.

USG Brand Screws—size & type	fastening applications
$\frac{7}{16}$ ", 1", $1\frac{1}{16}$ " and $1\frac{1}{8}$ " Type S-Bugle Head	Single and double-layer IMPERIAL Base to steel studs, metal furring; (1" screw only) IMPERIAL and USG R.H. Bases to RC-1 Resilient Channel
$1\frac{1}{4}$ ", $1\frac{1}{8}$ " & $2\frac{1}{4}$ " Type S-Bugle Head	Core units and face-layer IMPERIAL Base to steel runners in caged beam fireproofing
$1"$, $1\frac{1}{4}$ ", $1\frac{1}{8}$ ", $1\frac{1}{16}$ ", $2\frac{1}{8}$ " and $2\frac{5}{8}$ " Type S-12-Bugle Head	Metal lath, gypsum sheathing and IMPERIAL Base to steel studs in curtain wall assemblies
$1\frac{1}{8}$ " & $2\frac{1}{4}$ " Type S-Trim Head	Wood trim over single and double-layer IMPERIAL Base to steel studs and runners
$\frac{3}{8}$ " Type S-Pan Head or Hex Washer Head	Steel studs to steel runners
$\frac{3}{8}$ ", $\frac{1}{2}$ " Type S-12-Pan Head	Steel studs to metal door frame
$1\frac{1}{4}$ ", $1\frac{1}{8}$ ", $2\frac{1}{4}$ " Type S-Oval Head	Cabinets to steel studs and RC-1 Resilient Channel
$1\frac{1}{4}$ " Type W or S-Bugle Head	Single-layer IMPERIAL and USG R.H. Bases to wood framing; RC-1 Channels to wood framing
$1\frac{1}{2}$ " Type G-Bugle Head	Face-layer IMPERIAL Base to base-layer IMPERIAL Base in laminated partitions
$\frac{3}{4}$ " Type T-Pan Head	RC-1 Resilient Channel to TRUSSTEEL Studs

6. USG Structural Accessories

description

U.S.G. leads the industry in the development and acceptance of structural components for plastering systems. Included are non-load bearing studs of the truss and channel types, runner tracks, shoes and screws as needed; furring and lathing channels, and an adjustable wall furring bracket.

TRUSSTEEL Studs are used for framing hollow, fire-resistant partitions and curtain walls. They are formed from cold-drawn 7-ga. steel wire rods with tensile strength of 90,000 psi. A continuous diagonal wire web is welded to double wire flanges to provide an open-web design that readily accommodates pipes, conduits and ducts without impairing the partition's strength. Fabricated in five stud widths: $1\frac{5}{8}$ ", $2\frac{1}{2}$ ", $3\frac{1}{4}$ ", 4" and 6", factory-cut to job lengths.

TRUSSTEEL Snap-In Runner Track anchors the partition, permits stud to snap into place eliminating the need for stud shoes. When this track serves as a ceiling runner, stud shoes are used if a fire rating is required. Available for all except 6" width of studs; 10-ft. lengths.

TRUSSTEEL Runner Track is used with TRUSSTEEL Stud Shoes to anchor the partition at floor and ceiling, particularly where floor-to-ceiling height varies considerably. Available for all stud widths; 10-ft. lengths.

TRUSSTEEL Stud Shoes, 7" long and made from 24-ga. steel, are used to connect studs to runner track. Permit up to 4" adjustment in partition height.

Design Data—TRUSSTEEL Studs

stud size—(widths)	$1\frac{5}{8}$ "	$2\frac{1}{2}$ "	$3\frac{1}{4}$ "	4"	6"
weight—(lbs. per 1000 ft.)	440	455	470	485	515
deflection(1)	.355"	.168"	.117"	.094"	.072"
gauge	7-ga. (diameter .177) chords and diagonals				
tensile strength		85,000 psi—yield point			
percent of open area	67%	79%	84%	87%	91%

(1)Deflections of TRUSSTEEL Studs with 100-lb. concentrated load in a 5-ft. span are below the maximum allowable deflections of .20" for $2\frac{1}{2}$ " studs, .15" for $3\frac{1}{4}$ " studs, and .10" for 4" and wider studs specified in the requirements of the United States Corps of Engineers, General Services Administration, and Veterans Administration.

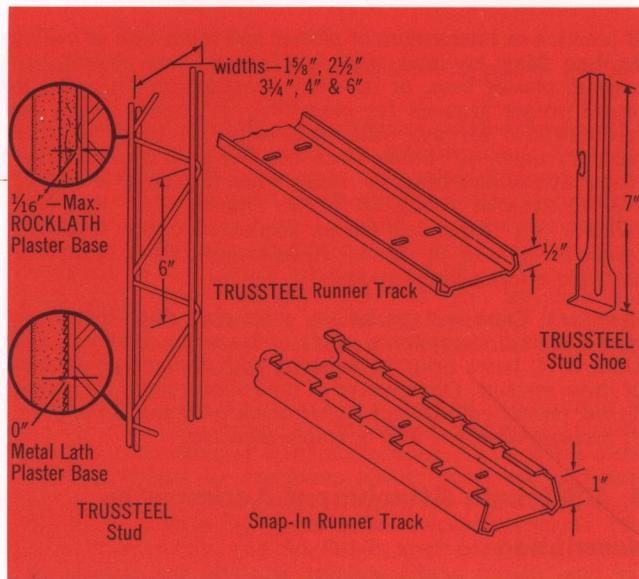
Structural Properties—TRUSSTEEL Studs

stud size	major axis			minor axis		
	I _x in ⁴	S _x in ³	r _x in	I _y in ⁴	S _y in ³	r _y in
$1\frac{5}{8}$ "	0.052	0.064	0.725	.0033	.0123	.1824
$2\frac{1}{2}$ "	0.132	0.106	1.162	.0033	.0123	.1824
$3\frac{1}{4}$ "	0.231	0.142	1.537	.0033	.0123	.1824
4"	0.365	0.183	1.916	.0033	.0123	.1824
6"	0.831	0.277	2.912	.0033	.0123	.1824

USG Steel Studs and Runners, channel-type and roll-formed from galvanized steel, are used in non-load bearing interior partition and exterior curtain wall systems. The secure, rigid screw or clip attachment of the plaster base utilizes the full structural contribution of the lath and plaster membrane. Limited chaseways are provided by punchouts in the web. Assemblies using these studs are low in cost with excellent sound and fire-resistance characteristics. Available in various styles and widths to meet functional requirements outlined below:

Interior Partitions, Ceilings, Column Fireproofing—ST5 and ST10 stud styles in seven widths— $1\frac{5}{8}$ ", 2", $2\frac{1}{2}$ ", 3", $3\frac{1}{8}$ ", 4", 6"—and 8 to 16-ft. lengths. Runners in stud widths 12-ft. length.

Exterior Curtain Wall—studs are available in various styles to meet height requirements and in nine widths—2", $2\frac{1}{2}$ ", 3",



3 1/2", 3 3/8", 4", 5 1/2", 6", 7 1/2"—lengths up to 28 ft. Runners in stud widths (with 1 1/4" unhemmed leg), 10-ft. lengths.

Studs and Runners, Style ST5 comply with ASTM C645; materials for Style ST10 comply with Fed. Spec. QQS-698 and QQS-775d, Class d.

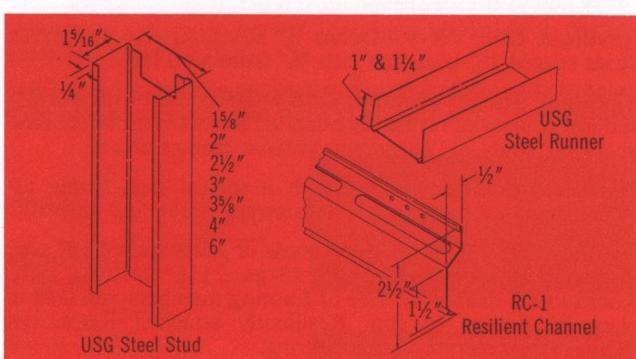
USG Metal Furring Channel is a roll-formed, galvanized steel ceiling and wall channel for screw attachment of ROCKLATH and IMPERIAL Bases. Product complies with ASTM C645.

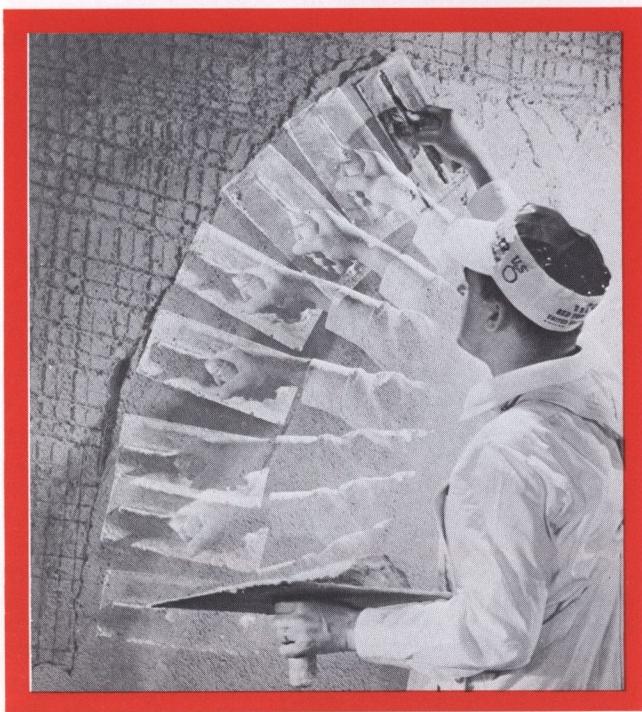
RC-1 SHEETROCK Resilient Channel is a galvanized steel channel for resilient attachment of IMPERIAL and USG R.H. Bases to wood or TRUSSTEEL Stud framing. One of the most effective, lowest-cost methods for improving sound control. Flange is prepunched for screw fastening to framing. Base is screw-attached to channel.

USG Z-Furring Channel is used to attach mineral-fiber insulation and IMPERIAL Base to masonry walls. Made of hot-dip galvanized steel. Suitable for 3/4" and 1" thick insulation.

USG Adjustable Wall Furring Brackets are used to attach 3/4" furring channels to exterior masonry walls. Made of 20-ga. galvanized steel, they are wire-tied to horizontal stiffeners in braced furring systems. Furring depth: 1/4" to 2 1/4" plus channel depth.

USG Lathing Channels are cold-rolled 16-ga. steel, either galvanized or black asphaltum painted; used for furring, suspended ceilings, partitions and ornamental lathing. Sizes: 3/4" and 1 1/2"; 16-ft. length.





per 100 lbs. of plaster must be added, and when used as a scratch or brown coat, 1 cu. ft. of sand may be added. Wood fiber plaster can be applied to all standard lath and masonry plaster bases; strongly recommended as a scratch coat for metal lath. Complies with ASTM C28 and Federal Specification SS-P-00402B Type III.

RED TOP Gypsum Plaster is a gypsum basecoat requiring the addition of aggregate and water on the job. Supplied in three types: *Regular*—for use with sand aggregate, hand application; *LW*—for use with lightweight aggregate, hand application; *Machine Application*—for use with sand or lightweight aggregate. Complies with ASTM C28 and Federal Specification No. SS-P-00402B, Type II. **Limitation:** not recommended for use with perlite aggregate when machine applied, with vertical lift over 30 ft. or hose length over 150 ft.

RED TOP Two-Purpose Plaster is a gypsum basecoat requiring the addition of aggregate and water on the job. Suitable for either hand or machine application and use with sand or lightweight aggregate meeting ASTM C35. Two-Purpose Plaster complies with ASTM C28 and Federal Specification No. SS-P-00402B, Type II. **Limitation:** not recommended for use with perlite aggregate when machine applied, with vertical lift over 30 ft. or hose length over 150 ft.

STRUCTO-BASE Gypsum Plaster is a special gypsum basecoat plaster that develops higher strengths than conventional plasters. It is recommended for such areas as handball courts, hospital corridors, schools, etc., or wherever a high-strength basecoat plaster is necessary. Complies with Federal Specification SS-P-00402B, Type II, and ASTM Designation C28 for "gypsum neat plaster" including the added requirement of 2,800 psi compressive strength.

STRUCTO-LITE Gypsum Plaster is a mill-mixed perlite aggregated gypsum plaster which requires the addition of only water at the job site. It is formulated in two types: *Regular*—for use over gypsum or metal lath; *Masonry*—for use on high suction unit masonry base only.

STRUCTO-LITE weighs less than half as much as sanded basecoat plaster; has a "k" factor of 1.74, providing three times the insulation value of sanded plaster. Over-all cost is com-

parable to job-mixed lightweight aggregate plaster. Complies with Federal Specification SS-P-00402B, Type I and ASTM C28 for gypsum ready-mixed plaster. **Limitations:** (1) Not recommended over metal lath when a smooth trowel lime finish is to be used. It may be sand-float finished, or used as a base for acoustical tile. (2) Not recommended for machine application with vertical lift over 30 ft. or hose length over 150 ft.

Portland Cement-Lime Plaster is used for interior applications where high moisture conditions exist, or as an exterior basecoat for stucco. Prepared on the job as follows:

Scratch and Brown Coats—Mix BONDCRETE or MORTASEAL Mason's Lime with portland cement and sand in accordance with ANSI A42.2, Type L. Suggested proportioning: *scratch coat*—1 bag portland cement, $\frac{3}{4}$ bag lime, 5 to 6 cu. ft. sand; *brown coat*—1 bag cement, 1 bag lime, 6 to 7 cu. ft. sand.

Finish Coat—ORIENTAL Exterior Finish Stucco (mill-mixed), a white, or colored float or texture finish plaster.

Limitations of portland cement plaster: (1) Scratch, brown and finish coats require curing with water after set; (2) Must not be applied directly to smooth, dense surfaces, gypsum lath or gypsum block. Self-furring metal lath must be secured to such surfaces before plaster is applied; (3) Control joints should be provided to compensate for shrinkage during drying; (4) A Keenes cement-lime putty finish must never be used over a portland cement basecoat.

Technical Data—Basecoat Plasters

	plaster	mix	compressive strength psi—dry (1)	weight lb. cu. ft. —dry	conductivity (k)
STRUCTO-LITE	(regular)		600-800	50	1.74
wood fiber		neat	1500-2000	82	3.15
wood fiber	(sand)	100:1	1200-1600	97	—
STRUCTO-BASE	(sand)	100:2 100:2½ 100:3	2800-3200 1900 min. 1400 min.	124 120 118	— — —
RED TOP gypsum plaster mixed with—	sand	100:2 100:2½ 100:3	750-1100 650-850 550-750	107 108 109	5.51 — 5.60
		100:2 100:3	600-800 450-600	48 41	1.64 1.31
		100:2 100:3	400-525 250-325	48 41	1.74 1.42
	vermiculite				

(1) Average Laboratory Test Results. Figures may vary slightly for products from individual mills. Tested in accordance with ASTM C472. Aggregate is in cu. ft.

Use of Aggregates with Gypsum Plasters maximum recommended proportions

plaster base	no. of coats	type of coats	maximum quantity of aggregate, in cu. ft. to be used with 100 lbs. of neat gypsum plaster			
			under smooth trowel finishes		under other finishes	
			sand (1)	perlite	sand (1)	perlite
GYPSUM LATH	3	scratch brown	2 3	2 2	2 3	2 3
	2	basecoat	2½	2	2½	2
METAL LATH	3	scratch brown	2 3	— —	2 3	2 2
UNIT MASONRY	3	scratch brown	3 3	3 3	3 3	3 3
	2	basecoat	3	3	3	3

(1) Approximately six No. 2 shovels of sand equal 1 cu. ft. One shovel equals 15 lbs. Note: In a construction system which has metal lath as the plaster base, perlite or vermiculite aggregate is not recommended for use in the basecoat plaster, unless a float or acoustical tile finish is used.

with perlite fines for use over lightweight aggregated base-coats, or unaggregated for use over sanded basecoats. Complies with ASTM C28 and Federal Spec. SS-P-00402B, Type V.

RED TOP Gauging Plaster—Similar to CHAMPION and STAR Gauging except it comes in a slightly darker color. Available either perlited or unaggregated. Complies with ASTM C28 and Federal Specification SS-P-00402B, Type V.

Monotron Surface Hardness (1)

(Lbs. required to force a 10 mm. diameter steel ball .01" into plaster face)

gauging-lime ratio (dry weight)	STRUCTO-GAUGE	regular gauging	Keenes Cement regular	quick-troweling
1:2	106	75		
1:1	236			
2:1			75	112
4:1			88	139

(1) Avg. laboratory-tested values when applied over sanded basecoat.

finishing limes

IVORY Finish Lime—Autoclaved—A 92% hydrated finishing lime. Does not require soaking, and virtually eliminates the possibility of future expansion within the finish coat because of unhydrated magnesium oxides. Complies with ASTM C206, Type S, and Federal Specification SS-L-351B, Type F (not more than 8% unhydrated oxides).

RED TOP and GRAND PRIZE Normal Hydrate Finish Lime—Hydrate lime which requires soaking at least 16 hours to develop proper plasticity and the degree of hydration necessary prior to use. Complies with ASTM C6, Type N, and Federal Specification SS-L-351B, Type F.

RED TOP Finish Quicklime—High-calcium finishing lime which requires 16 hours soaking to develop proper plasticity and hydration prior to use. Complies with ASTM C5.

general lathing and plastering specifications

notes to architect

The following recommendations and specifications are minimum basic guides for preparation of job specifications. They are for normal construction and are not intended to cover every possible design or job condition.

Detailed specifications for the various systems are provided in pertinent U.S.G. System Folders.

Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.

Part 1: general

1.1 scope—Specify areas to receive this treatment.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials, except water and sand, shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather, all glazing shall be completed and the building heated to minimum of 55°F. before lath installation. Temperature of building shall be maintained in uniform range above 55°F. for an adequate period prior to application of plaster, while plastering is being done, and after plaster is dry. Heat shall be well distributed in all areas, with deflection or protective screens used to prevent concentrated or irregular heat on plaster areas near source. When required, heat shall be furnished by ().

b. Ventilation shall be provided to properly dry conventional plaster during and subsequent to its application. In glazed buildings, this shall be accomplished by keeping windows open sufficiently to provide air circulation; in enclosed areas lacking normal ventilation, provisions must be made to mechanically remove moisture-laden air. For veneer plaster, a minimum ventilation level shall be maintained until the plaster has set and dried.

c. If glazed sash are not in place and the building is subjected to hot, dry winds or temperature differentials from day to night of 20°F. or more, openings shall be screened with cheesecloth or similar material.

1.5 protection

Proper protection shall be provided during plastering for finished door and window frames and other designated areas which do not receive a plaster finish.

Part 2: products

2.1 lathing materials

a. **Plaster Base:** (ROCKLATH Plaster Base (thickness), (regular), (FIRECODE), (Long Length), (Foil-Back).)

(IMPERIAL Gypsum Base (thickness), (Regular) (FIRECODE) (FIRECODE "C").) Specify only with IMPERIAL Plaster, #900 Corner Bead and IMPERIAL Joint Reinforcement Tape.

(USG R.H. Base (thickness).) Specify only with RED TOP Radiant Heat Plaster and IMPERIAL Joint Reinforcement Tape.

(USG Metal Lath (weight), (Junior Diamond Mesh) (USG Poly-Backed Metal Lath) (Z-Riblath) (3/8" Riblath) (Expanded Metal Stuccomesh).)

(PYROBAR Gypsum Partition Tile (thickness), (hollow) (solid) used with RED TOP Partition Tile Cement.)

b. **Reinforcement:** (USG 1-A, 4-A, #800, #900 Corner Bead, Cornerite, Striplath.)

c. **Control Joint:** USG Control Joint (#50, #75, #100 or #093).

d. **Casing Bead:** (size) #66 USG Casing Bead or USG Metal Trim (701-A) (701-B) (801-A) (801-B).

e. **Lath Attachment Clips:** (BRIDJOINT Clip B-1 or B-2; BRACE-TITE Field Clip or Starter Clip BT-1; TRUS-LOK Field Clip TL-1, Starter Clip TL-2, Drive-In Clip TL; Field Clip MS-1; SUPER-TITE Clip; USG Bracing Clip; USG Ceiling Runner Clip; USG Resilient Clip TR-1, R-SF, R-1, R-2, or R-5).

f. **Screws:** (7/8", 1", 1 1/4", 1 5/16", 1 5/8", 1 7/8", 2 1/4", 2 3/8" or 2 5/8" USG Brand Type S or S-12, Bugle Head) (1 5/8" or 2 1/4" USG Brand Type S, Trim Head) (3/8" USG Brand Type S Pan Head or Hex Washer Head) (3/8" or 1/2" USG Brand Type S-12 Pan Head) (1 1/4", 1 5/8" or 2 1/4" USG Brand Type S Oval Head) (1 1/4" USG Brand Type W) (1 1/2" USG Brand Type G) (3/4" USG Brand Type T).

g. **Furring Channels:** (USG Metal Furring Channels) (USG Z-Furring Channels).

h. **Steel Studs:** (size) (TRUSSTEEL Studs, used with TRUSSTEEL Snap-In or TRUSSTEEL Runner Track, TRUSSTEEL Stud Shoes) (USG Steel Studs, used with USG Steel Runner).

i. **Furring Brackets:** USG Adjustable Wall Furring Brackets.

j. **Lathing Channels:** USG Lathing Channels.

k. **Resilient Channels:** RC-1 SHEETROCK Resilient Channels.

2.2 plastering materials

- a. **Basecoat Plaster:** (STRUCTO-BASE Gypsum Plaster) (RED TOP Wood Fiber Plaster) (RED TOP Gypsum Plaster) (RED TOP Two-Purpose Plaster) (STRUCTO-LITE Plaster) (IMPERIAL Basecoat Plaster) (RED TOP Radiant Heat Basecoat Plaster).
- b. **Aggregate:** (Sand) (Perlite) meeting ASTM C35 requirement. Sand for float finishes shall be graded (white) silica sand passing a (30 mesh) (20 mesh) screen.
- c. **Water:** Potable and not contain impurities that affect the setting of gypsum.
- d. **Finish Lime:** (IVORY) (GRAND PRIZE) (RED TOP).
- e. **Gauging Plaster:** (STRUCTO-GAUGE) (Keenes Cement) (STAR) (CHAMPION) (RED TOP).
- f. **Prepared Finish:** (IMPERIAL Finish Plaster) (DIAMOND Interior Finish) (RED TOP Radiant Heat Finish Plaster).
- g. **Exterior Stucco Finish:** ORIENTAL Exterior Finish.
- h. **Grout:** (RED TOP Gypsum Plaster) (STRUCTO-LITE Basecoat).

2.3 mixes

- a. **Basecoat Plaster** (and Aggregate) shall be mixed in proportions of _____ (specify from technical data, page 8).
- b. **Finish Plaster** shall be mixed in proportion by dry weight of _____ parts of gauging to _____ parts of lime (specify from application data, page 9), according to the manufacturer's directions. Over lightweight aggregate basecoats, add 1/2 cu. ft. of perlite fines or 50 lbs. of No. 1 silica sand per 100 lbs. of gauging plaster, or use mill-aggregated gauging.
- c. **IVORY Lime** shall be box soaked or machine mixed for immediate use with approx. 5½ to 6 gallons of water for each 50-lb. bag.
- d. **GRAND PRIZE or RED TOP Lime** shall be box soaked or machine mixed using approx. 6 gallons of water per 50-lb. bag, and allowed to soak for 16 hours.

Part 3: execution

Refer to appropriate System Folders for detailed specifications on lathing and accessories application. For lathing and plastering specification for handball courts, refer to U.S.G. Bulletin PM-125.

3.1 control joint installation

Where indicated on drawings, attach USG Control Joints (size) with Bostitch $\frac{1}{16}$ " "G" staples or equal spaced not over 6" apart in each flange. (Control Joints Nos. 50, 75, 100—splice ends together with 16-ga. tie wire inserted into openings in the key-lock sections.) (Control Joint No. 093—square-cut end joints, butt together and align for neat fit.) Remove protective tape after plastering.

a. **Interior Ceilings**—space control joints not exceeding () ft. in either direction and with the area of separated sections not exceeding () sq. ft. (see pertinent U.S.G. System Folders). Break lath behind control joints; where channel framing is used, also break the channels. Position control joints to intersect light fixtures, heating vents, air diffusers, etc.

b. **Interior Walls and Partitions**—space control joints maximum of 30 ft. apart; control joints may occur over door frames as indicated in drawings. When control joints are used in conjunction with PYROBAR Partition Tile, kerf the tile directly under the control joint, to a depth of $\frac{3}{4}$ ".

c. **Exterior Soffits of Gypsum Plaster**—space control joints not exceeding 25 ft. in either direction. Break lath and channel behind control joints. All other specifications listed above are applicable.

d. **Exterior Walls, Soffits and Canopies of Portland Cement Stucco**—space control joints not exceeding 10 ft. in either direction. Where there is an intersection of vertical and horizontal joints, use continuous horizontal joint and butt the vertical joint. Caulk splices and intersections exposed to the elements with a silicone rubber

caulking cement. In soffits and canopies, break lath and channel behind control joints.

3.2 Plaster thicknesses shall be as shown on plans; however, in no case shall the grounds be less than:

USG Metal Lath— $\frac{5}{8}$ " (from face of lath)
 ROCKLATH Plaster Base— $\frac{1}{2}$ "
 Long Length ROCKLATH— $\frac{3}{4}$ "
 PYROBAR Partition Tile or other Masonry Units— $\frac{5}{8}$ "
 Monolithic Concrete Ceilings— $\frac{1}{8}$ " ($\frac{3}{8}$ " maximum)
 Monolithic Concrete Walls— $\frac{1}{8}$ " ($\frac{5}{8}$ " maximum)
 IMPERIAL Plasters— $\frac{1}{16}$ " to $\frac{3}{32}$ " (over special gypsum base)
 RED TOP Radiant Heat Plasters— $\frac{1}{4}$ " (over special gypsum base);
 $\frac{3}{8}$ " (over monolithic concrete)

3.3 basecoat application—Mix basecoat plasters by hand or in a mechanical mixer to a uniform consistency following manufacturer's directions. Apply basecoat plaster by (hand) (machine) in (1) (2) coats. Monolithic or unit masonry surfaces that exhibit high suction shall be moderately wetted immediately before plastering.

a. **Two-coat work:** Over gypsum lath and masonry, apply base (first) coat with sufficient material and pressure to form good bond to base and to cover well, and then double back to bring plaster out to grounds. Straighten to a true surface with rod and darby without use of additional water and leave rough to receive finish (second) coat.

b. **Three-coat work:** Apply scratch (first) coat with sufficient material and pressure to form good full keys on metal lath, and good bond on other bases, and then cross-rake. Apply brown (second) coat after scratch (first) coat has set firm and hard. Bring out to grounds and straighten to a true surface with rod and darby without use of additional water. Leave rough to receive finish (third) coat.

3.4 special applications

a. **Solid Long Length Gypsum Lath Partition:** Apply scratch coat $\frac{3}{8}$ " thick, with a maximum set of 3 hours, to each side of lath, both sides to be scratch coated within 3 hours. Cross-rake lightly in horizontal direction only. Apply brown coat to unbraced side after scratch coats have set and partially dried (not less than 16 hours). After brown coat has set firmly (not less than 3 hours), carefully remove braces and brown coat second side. Bring brown coat out to a true plane and leave rough.

b. **Solid Studless Metal Lath Partition:** Apply scratch coat to side opposite bracing, and allow to set and partially dry. Then apply brown coat to side opposite braces, allowing it to set thoroughly before removing temporary braces. Next apply brown coat to previously braced side to bring plaster out to grounds. Straighten to a true surface with rod and darby without use of additional water, and leave rough to receive finish coat.

c. **Solid Channel Stud Metal Lath Partition:** Apply scratch coat to lath side and allow to set and partially dry. Then apply back-up coat to channel side to full grounds, $\frac{1}{2}$ " over channels, in not less than two operations and allow to set. Then apply brown coat on lath side to bring plaster out to grounds. Straighten to a true surface with rod or darby without use of additional water, and leave rough to receive finish coat.

d. **Resilient ROCKLATH Plaster Base Ceiling:** Use three-coat method only, allowing scratch coat to set and partially dry before applying brown coat.

e. **BRACE-TITE System Ceiling:** The three-coat method is recommended. If the two-coat system is used, a minimum of 20 minutes must be allowed before doubling back and the setting time of the basecoat must not exceed 3 hours.

f. **Monolithic concrete** to which a plaster bonding agent is to be applied shall be free of dirt, dust, grease, wax, oil or other unsound surface conditions. Laitance, efflorescence and parting compounds shall be chemically removed. Apply plaster bonding agent to concrete surface in a continuous film according to manufacturer's

directions. Apply basecoat plaster by firmly grinding a thin coat into the bonding agent. Immediately double back to a completed thickness of $\frac{1}{16}$ " to $\frac{3}{32}$ " having a level surface ready for finish plaster application.

g. Portland Cement Basecoats shall be proportioned (specify from page 8), and applied in two coats. Cross-rake scratch coat and after setting, damp-cure for not less than 48 hours. Damp-cure brown coat after setting for not less than 48 hours.

h. IMPERIAL Basecoat Plaster: When applied directly over concrete block, fill all voids and depressions including joints; leave rough and allow to set prior to lime putty finish application. Spray concrete block uniformly with water immediately before applying IMPERIAL Basecoat Plaster. Cover monolithic concrete surfaces with an application of plaster bonding agent prior to plastering. RED TOP Accelerator may be used to quicken set. Total basecoat shall be $\frac{1}{16}$ " to $\frac{3}{32}$ " thick.

i. IMPERIAL Basecoat Plaster: When applied directly to IMPERIAL Gypsum Base, embed tape and fill beads, and allow plaster to set; then scratch and immediately double back to a thickness of $\frac{1}{16}$ " to $\frac{3}{32}$ ", in accordance with manufacturer's directions.

j. Where plaster is flush with metal base, metal door frames, etc., groove at the junction to reduce the possibility of chipping. Cut basecoat plaster free from these metal sections before plaster sets.

k. Grout all steel door frames in solid plaster and steel stud partitions prior to lathing.

3.5 finish coat application

a. Trowel Finish Coats: Scratch plaster in thoroughly and immediately double back to fill out to a smooth, dense surface for decoration, free of surface blemishes and irregularities. Apply finish coat as thin as possible, preferably $\frac{1}{16}$ " to not more than $\frac{1}{8}$ " maximum thickness. Trowel Keenes Cement Finishes until the material sets.

b. Float Finish Coats: Scratch plaster in thoroughly and immediately double back to a true, even surface. Float using a (shingle) (cork) (wood) (carpet) or (rubber) float to bring aggregate to the surface to produce a finish of uniform texture free of slick spots, cat faces and other blemishes. Use water sparingly in natural color, and no water on colored finishes. With ORIENTAL Exterior Finish Stucco, use no water in floating or texturing. Fog-spray surface with water for several days after setting.

c. Machine-Applied Spray Finishes: Apply plaster uniformly to produce a texture approved by the architect.

d. IMPERIAL Finish Plaster: Over IMPERIAL Gypsum Base embed tape, fill beads and allow to set; then scratch and immediately double back to a thickness of from $\frac{1}{16}$ " to $\frac{3}{32}$ ", in accordance with manufacturer's directions. Over IMPERIAL Basecoat Plaster, scratch and immediately double back to $\frac{1}{16}$ " thickness.

e. DIAMOND Interior Finish: Over IMPERIAL Gypsum Bases embed tape, fill beads and allow to set; then apply a thin, tight scratch coat over entire working area. Immediately double back with material from same batch to a nom. $\frac{1}{16}$ " thickness. Over IMPERIAL Basecoat Plaster, scratch and immediately double back to $\frac{1}{16}$ " thickness.

f. RED TOP Radiant Heat Plasters: In wood frame and metal grillage constructions, apply plasters according to manufacturer's specifications (see U.S.G. Bulletin P-480). In monolithic concrete ceilings, prepare the surface with plaster bonding agent in a continuous film. Apply RED TOP Radiant Heat Plaster in same manner prescribed for wood frame ceilings except to total thickness of $\frac{3}{8}$ "—consisting of $\frac{5}{16}$ " fill coat of Basecoat Plaster to completely cover the cable and anchor device, and $\frac{1}{16}$ " coat of Finish Plaster.

3.6 ornamental plastering

Execute ornamental plaster in accordance with scale details shown on the drawings. Run cornices and mouldings full, straight and true with moulding plaster, using clean cut metal conforming to the profiles shown on the drawings. Align lines accurately with square intersections, and accurate miters at corners and angles. Prepare enriched ornamental work which cannot be run in place with RED TOP Casting Plaster cast in gelatine molds. Back the work solidly with jute or burlap and properly reinforce with galvanized steel. Anchor securely with copper wires not lighter than 16 gauge. Make all joints carefully and point neatly so as to be invisible. Sandpaper rough spots and leave the entire work in proper condition, ready for decoration.

3.7 patching

Point up around trim and other work. Cut out and patch defective and damaged plaster. Patch plaster to match existing work in texture and finish flush and smooth.

3.8 completion

At the completion of the finish plaster work, clean all plaster from beads, screeds, metal base and metal trim, leaving work ready for decoration by others. Remove all plaster rubbish, excess material, scaffolding, tools and other equipment from the building, leaving floors broom clean.

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improved fire-resistant drywall partitions for enclosing shafts in multi-story buildings

USG Cavity Shaft Walls have been improved for greater economy but still retain all previous high-performance characteristics. Engineering modifications provide a thinner, lighter weight assembly that offers faster installation and lower material costs, producing lower in-place costs as well as savings in structural steel. In addition, USG Shaft Walls provide up to 4-hour fire resistance and sound ratings to 51 STC. They resist lateral loads up to 15 psf; also resist fatigue failure under cyclic lateral loading.

description

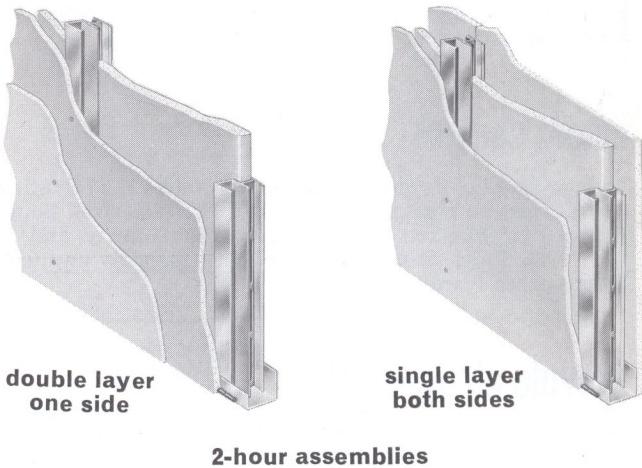
USG Cavity Shaft Walls are lightweight, non-load bearing gypsum drywall assemblies designed for erection from outside the shaft at each floor. Shafts are enclosed early in construction, the walls finished later along with interior partitions. This fast-installation feature combined with low-cost materials and high performance values, make USG Shaft Walls superior enclosures for elevator and mechanical shafts, air ducts and stairwells in multi-story buildings.

This latest improvement in gypsum shaft walls uses lower-cost studs and gypsum panels than other shaft walls. Dead load is 10% less for a partition having 2-hour fire resistance and equivalent structural strength. In addition to a 1½" deep x 22½" wide vertical chaseway, the C-H Stud used has 1" dia. holes 16" from each end for horizontal conduit runs.

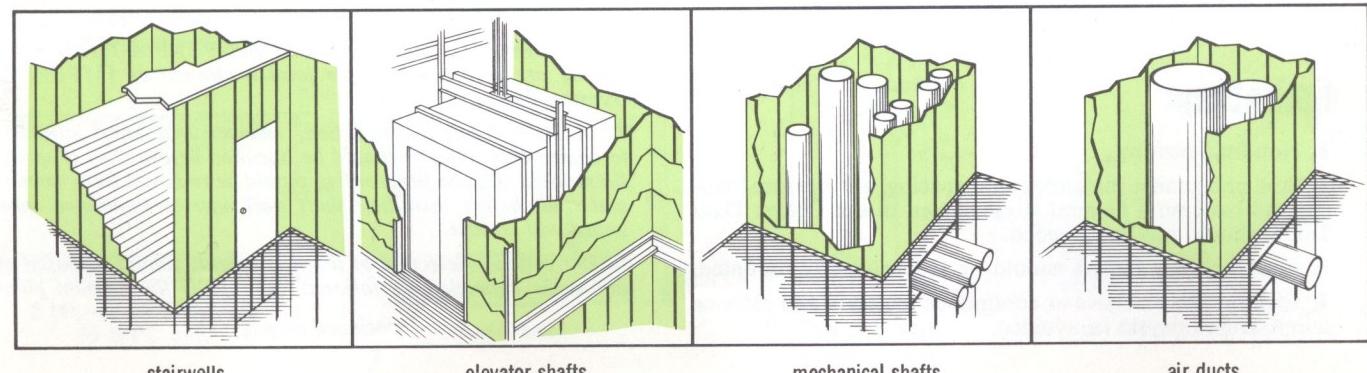
The assemblies consist of SHEETROCK FIRECODE "C" Gypsum Panels or IMPERIAL FIRECODE "C" Gypsum Base and veneer plaster, steel studs and runners, and USG Shaft Wall Liner.

Liner panels have a special fire-resistant core and multi-layered green paper facings that are treated to resist moisture penetration. Available in lengths to 16 ft., the panels are 1" thick, 24" wide and have beveled edges. SHEETROCK FIRECODE "C" Panels for these systems are ½" or ⅜" thick and 4 ft. wide. IMPERIAL FIRECODE "C" Gypsum Base, ½" or ⅜" thick and 4 ft. wide, has a high-strength, high-density core covered with special-absorption face paper for a veneer finish. USG Steel J-Runners, C-H Studs and E-Studs are formed from hot-dip galvanized steel.

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2-hour assemblies



engineered performance to meet design requirements

The systems have been designed and tested using accepted engineering practices with deflection criteria of 1/120, 1/240 and 1/360 clear partition heights. A wide range of product and installation combinations is available to meet performance requirements: air pressure loading of 5, 7½, 10, 15 psf; vertical heights up to 15 ft. using 2½" studs with greater heights available for lobbies and mechanical rooms using 4" studs (see Design Tables, page 7). Up to 4-hour fire-resistance ratings.

faster completion—earlier occupancy

USG Shaft Walls erect easily using components and application procedures familiar to mechanics. Cavity Shaft Walls, because they are erected without adhesives, install faster than other multi-layer gypsum panel systems. All USG Shaft Wall Systems install from each floor, leaving shaft free of scaffolding. Elevators go in months earlier than with masonry enclosures—ready to move men and materials to floors when they are needed. Jobs move faster, schedules are more easily met and buildings can be occupied sooner.

economy

USG Shaft Walls utilize low-cost materials and a minimum number of components. The assemblies are lightweight, ranging from the exceptionally low 9 psf for 2-hour systems to 16 psf for the 4-hour assembly. In high-rise buildings, where masonry shaft enclosures can weigh up to 45 psf, USG Shaft Walls offer an opportunity for significant savings in structural steel framing costs.

sound control

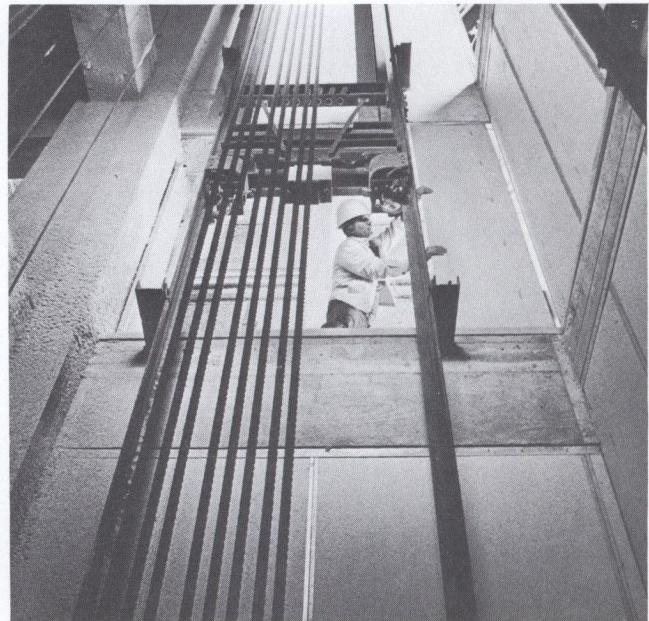
The standard Cavity Shaft Wall assembly offers 39 STC rating; 48 STC can be obtained by adding 1" THERMAFIBER Sound Attenuation Blankets within the partition cavity and 51 STC with RC-1 SHEETROCK Resilient Channels and 1½" THERMAFIBER Blankets.

provide airtight seal

With USG Acoustical Sealant applied to partition perimeter and penetrations, the assemblies resist air pressure surges up to 15 psf (see details). This minimizes whistling and dirt accumulation due to air movement in elevator shafts.

limitations

1. Non-load bearing.
2. Stud and runner thickness, stud spacing, air pressure loading and maximum flexural stress shown in the Design Data Tables should not be exceeded.
3. Elevator door frames should be independently mounted.
4. Exposure to excessive or continuous moisture and extreme temperatures should be avoided.



USG Shaft Walls withstand air-pressure loads which high-speed elevators create. These forces have dislodged masonry units in some building shafts.

specifications—notes to architect

1. *Shaft wall surfaces should be isolated with control joints or other means where: (a) construction changes within the plane of the shaft wall; (b) shaft wall run exceeds 50'. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.*
2. *Penetrations of the diaphragm, such as door frames and duct openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used. Penetrations greater than 48" wide require supplemental support for the shaft wall at the opening.*
3. *Where access panels or large duct penetrations occur in shafts having pressure loads, headers, sills and adjacent channels may require reinforcing to properly distribute these loads.*
4. *Where shaft walls enclose elevator and return air vents, and intermittent pressures up to 15 psf are expected, sealant is recommended at intersections with floors, ceilings, columns, ducts, etc. to seal peripheries and penetrations and minimize whistling and dirt accumulation due to air movement. Sustained pressures require special details to seal the wall.*
5. *USG Brand Type S Screws are suitable for gypsum panel or gypsum base attachment to styles 5 and 10 steel studs. Type S-12 Screws should be specified for other applications to steel heavier than 20-ga. Screw length should be 1" for base layer and 1 ½" for face layer and at least ¾" longer than the total thickness for other applications.*
6. *DURABOND Joint Compound and PERF-A-TAPE Reinforcing are recommended for joint treatment of IMPERIAL Gypsum Base.*
7. *In steel frame construction, runners and studs attached to beams and columns should be installed before steel is spray-fireproofed. Excess fireproofing should be removed from runners and studs before installing shaft wall liner or laminated core-board and sealant.*
8. *Deflection—Selection of limiting heights should be based on allowable deflection as follows: (a) 1/240 for gypsum panel*

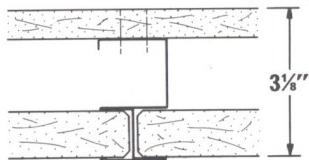
(continued on page 7)

USG Cavity Shaft Walls Systems

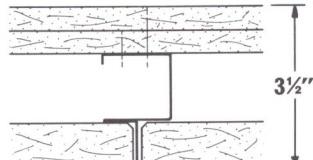
test data/components

fire rating	description	test no.	stc rating		comments
			11-f	16-f	
1 hr.	Cavity Shaft Wall Gypsum Drywall—½" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels appl to side opp liner panels & screw att—joints fin wt 8 width 3½"	U of C 3-6-75 U of C 3-7-75	(f) (f)		Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs.	Cavity Shaft Wall Gypsum Drywall—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels appl vert to side opp liner panels & screw att—joints fin wt 9 width 3½"	U of C 3-4-75 U of C 3-5-75	(f) (f)		Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs.	Cavity Shaft Wall Gypsum Drywall—½" SHEETROCK FIRECODE "C" gypsum panels—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin wt 9 width 3½"	BBN-750706 USG-750302	(s) (s)	47 39	Construction fire-tested both sides. Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs. est	Cavity Shaft Wall Gypsum Drywall—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—RC-1 chan spaced 24" o.c.—1½" THERMAFIBER sound atten blkts—panels & RC-1 chan screw att to side opp liner panels—base layer appl horiz—face layer appl vert—joints fin wt 10 width 4"	BBN-750412	(s)	51	Estimated fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
3 hrs. est	Cavity Shaft Wall Gypsum Drywall—3 layers ½" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels screw att to side opp liner panels with joints stag—base & face layers appl vert—mid layer appl horiz—joints fin wt 12 width 4½"			N/A	Estimated fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
4 hrs. est	Cavity Shaft Wall Gypsum Drywall—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels face side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—1" liner panels & ½" gypsum panel core screw att to studs—horiz USG met fur chan 24" o.c.—face side panels screw att to fur chan—panels appl vert with joints stag—joints fin wt 16 width 6¼"			N/A	Estimated fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface

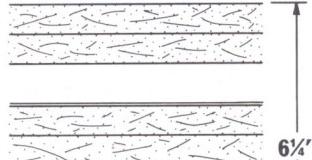
rated assemblies



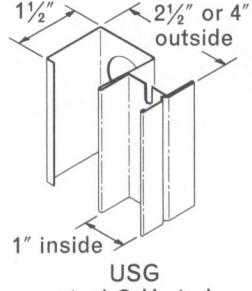
1 Hr.—U of C 3-6-75
1 Hr.—U of C 3-7-75



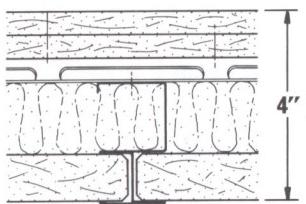
2 Hr.—U of C 3-4-75
2 Hr.—U of C 3-5-75
39 STC USG-750302



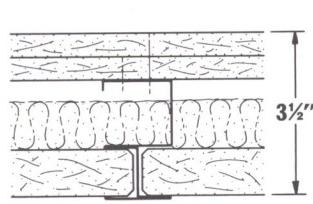
4 Hr. est.



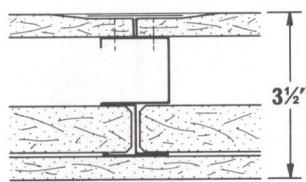
1" inside
USG steel C-H stud
2 1/2" or 4" outside



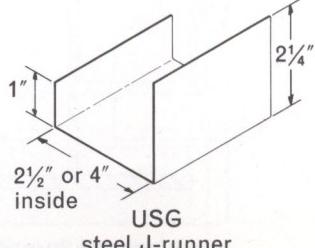
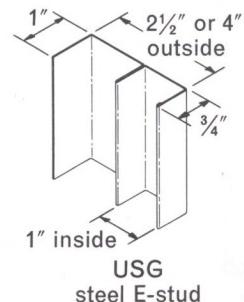
2 Hr. est.
51 STC—BBN-750412



2 Hr. est.
47 STC—BBN-750706

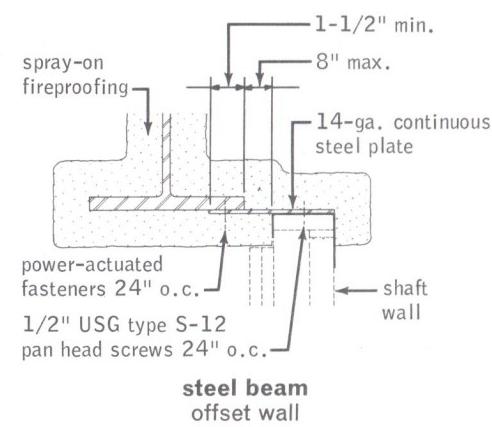
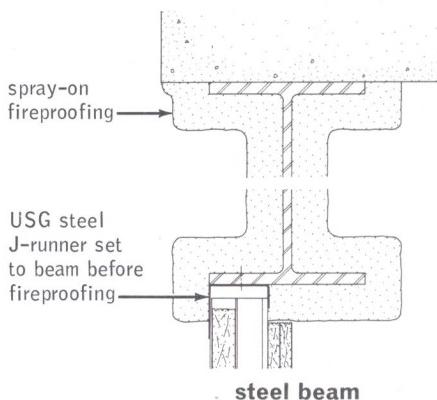
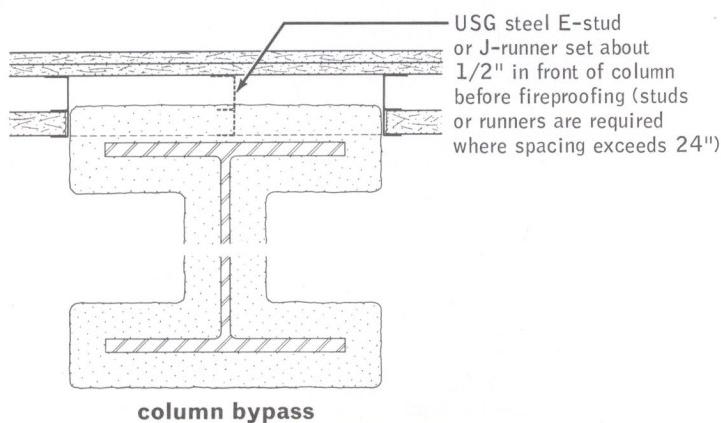
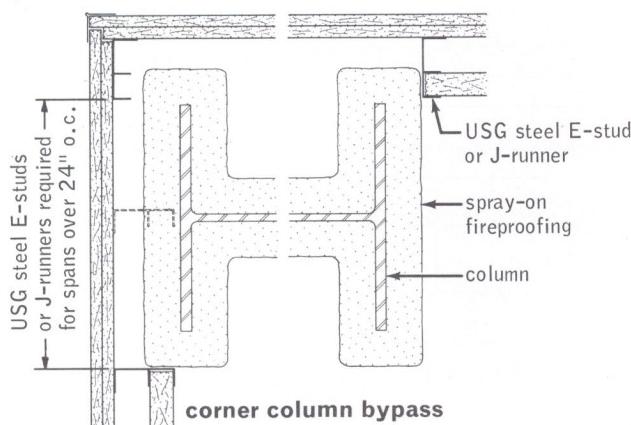
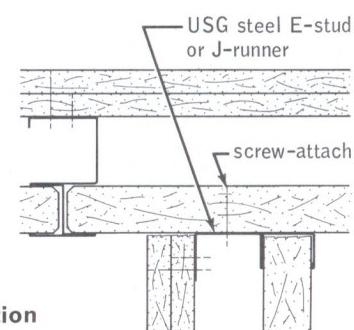
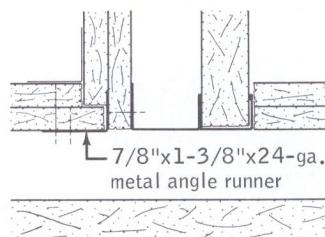
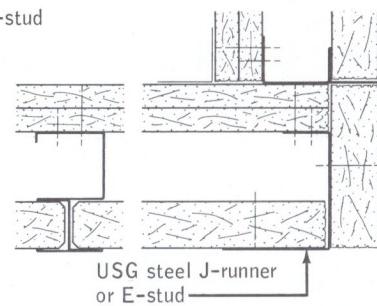
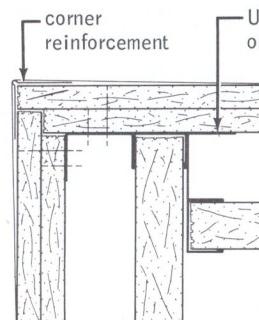
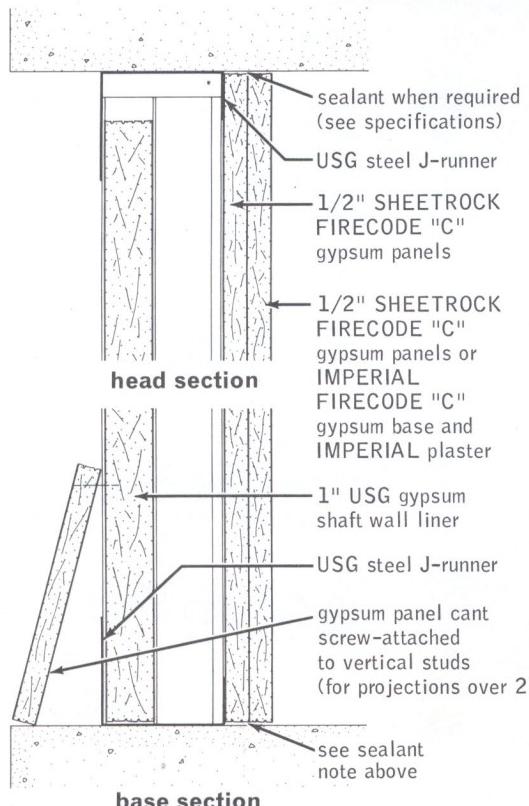


2 Hr.—U of C 6-23-75
39 STC est.



details

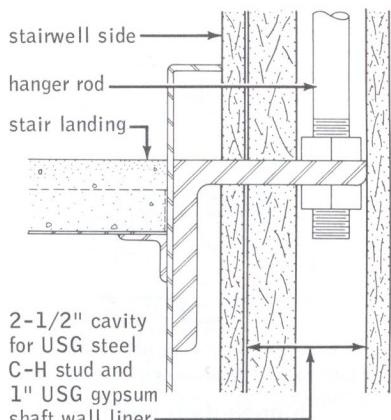
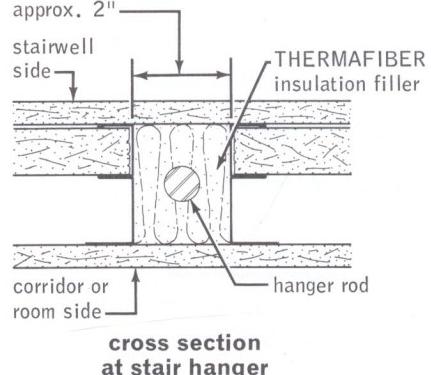
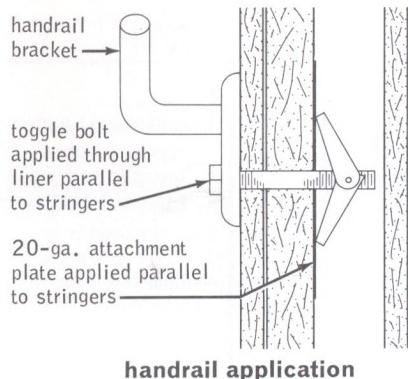
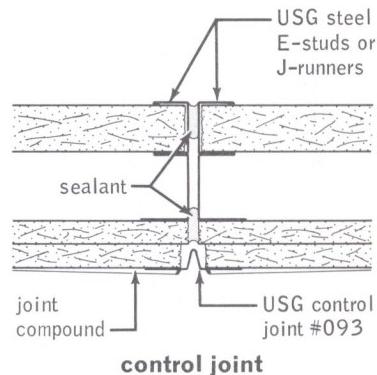
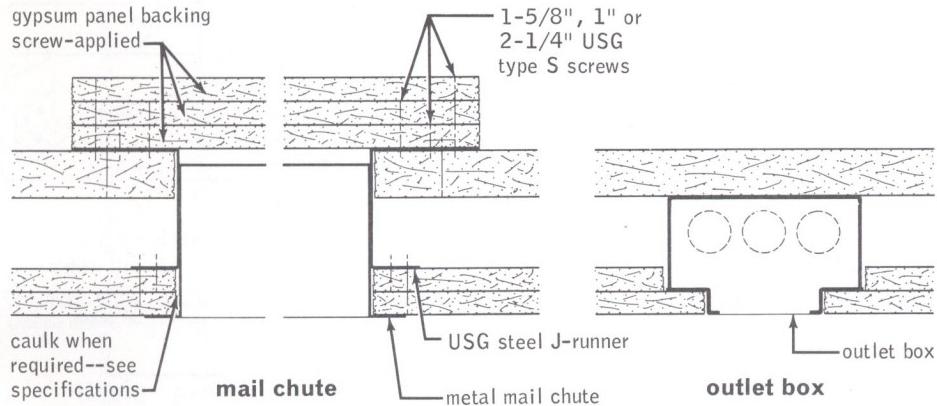
scale: $1\frac{1}{2}''$ & $3'' = 1'-0''$



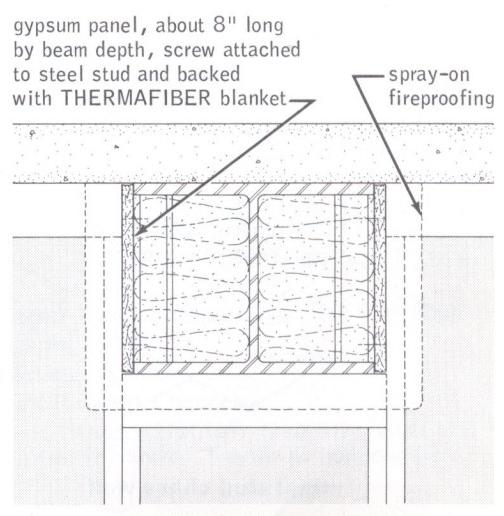
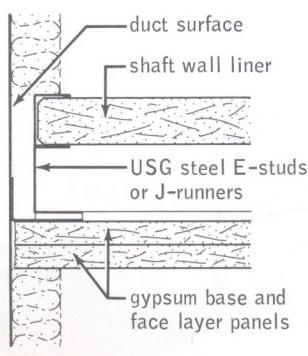
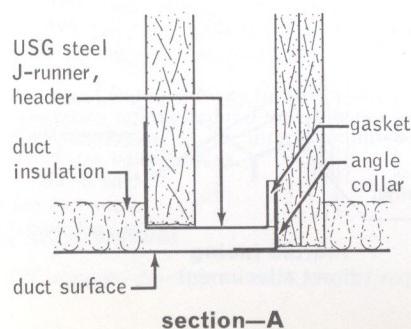
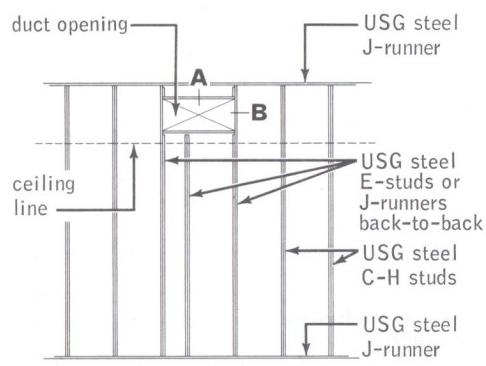
details

USG Cavity Shaft Walls Systems

scale: 3" = 1'-0"

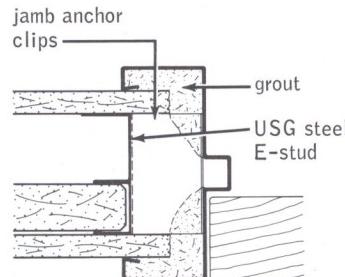
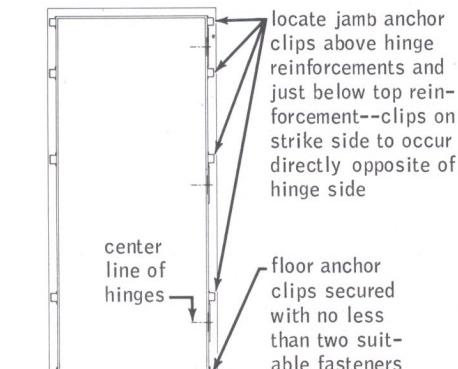


typical penetrations



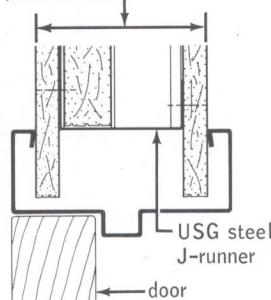
details

typical elevations

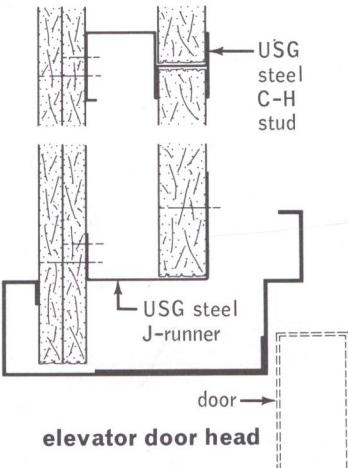


cross section thru frames

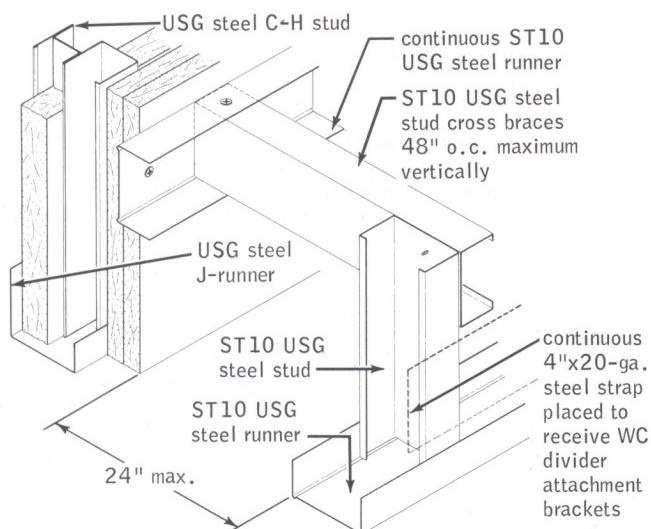
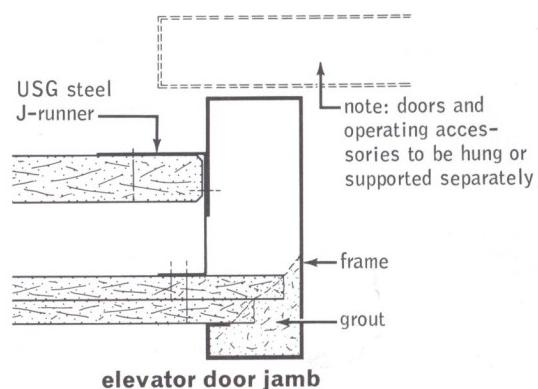
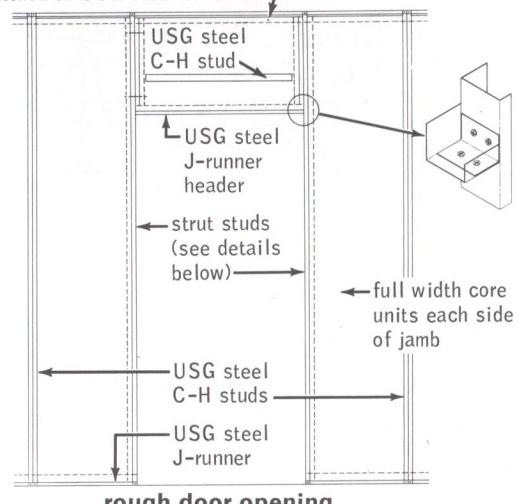
throat opening equals gypsum thickness plus 3/32" min.



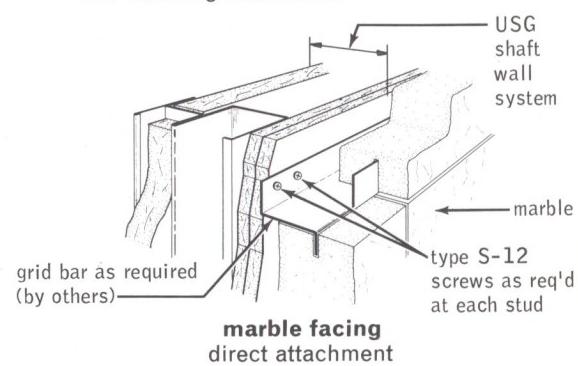
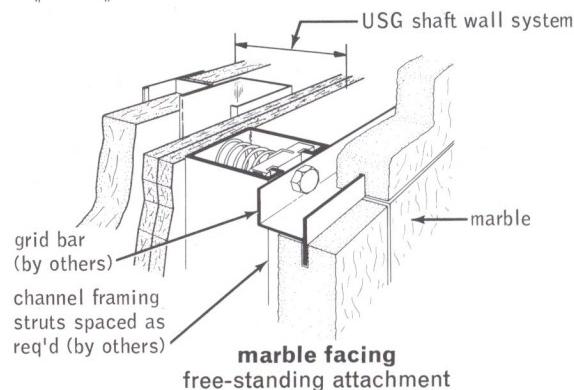
hinged door head



screw-attach to USG steel J-runner



metal stud chase wall



design data/specifications

limiting heights—2 hr. fire-rated system

stud type & size	designation	stud spacing	allowable deflection	air pressure load—psf			
				5	7.5	10	15
2½" C-H Studs	212CH5	24"	1/120	14'0"(f)	11'3"(f)	10'0"(f)	8'0"(f)
			1/240	13'9"(d)	11'3"(f)	10'0"(f)	8'0"(f)
			1/360	12'0"(d)	10'6"(d)	9'6"(d)	8'0"(f)
4" C-H Studs	212CH8	24"	1/120	18'0"(f)	14'9"(f)	12'9"(f)	10'6"(f)
			1/240	15'0"(d)	13'0"(f)	12'0"(d)	10'6"(d)
			1/360	13'3"(d)	11'6"(d)	10'6"(d)	9'0"(d)
4" C-H Studs	400CH5	24"	1/120	19'3"(f)	15'6"(f)	13'9"(f)	11'3"(f)
			1/240	18'0"(d)	15'9"(d)	13'9"(f)	11'3"(f)
			1/360	15'9"(d)	13'6"(d)	12'6"(d)	11'0"(d)
4" C-H Studs	400CH10	24"	1/120	25'9"(d)	22'6"(d)	20'0"(f)	16'6"(f)
			1/240	20'6"(d)	17'9"(d)	16'3"(d)	14'3"(d)
			1/360	18'0"(d)	15'6"(d)	14'3"(d)	12'6"(d)

Limiting criteria: f—bending stress, d—deflection. Runner attachment spacing should not exceed 24" o.c.

design properties—steel components

stud size	designation	weight (lb/in ft)	Sx (in ³)	Ix (in ⁴)	end reaction (lb)
2½"	212CH5	.604	087	.138	205
	212CH8	.862	185	.327	422
4"	400CH5	.716	.258	.433	173
	400CH10	1.217	.431	.933	282

notes to architect (continued from page 2)

surfaces, veneer plaster surfaces, and areas to receive adhesively applied ceramic tile; (b) mechanically attached marble or heavy stone should support its own weight from the floor or be separately supported. While some building codes permit design using 1/120 deflection and 5 psf uniform load, this large deflection may cause failure of screws attaching gypsum panels to steel components.

9. Metal door frames should be at least 16-ga. steel, shop primed, and have throats accurately formed to overall thickness of the shaft wall plus $\frac{3}{32}$ " minimum. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchor clips should be 18-ga. steel welded in jamb (see details, page 6), and screw-attached to studs.

All one-piece frames should be grouted after shaft wall liner is installed. Apply DURABOND or USG Ready-To-Use Joint Compound just before inserting face layer into frame. Do not terminate panels against trim return. Provide additional bracing where required by installing diagonal bracing from jamb strut studs to structure.

10. Where Cavity Shaft Wall height exceeds 14 ft., liner panel end joints should be positioned within the upper and lower third-points of wall and studs should be screw-attached to runners. Also, joints in adjacent panels should be staggered top and bottom to prevent a continuous horizontal joint.

11. See U.S.G. Product Folders in this series: Gypsum Panels Folder SA-927 for shaft wall components and joint system specifications; Gypsum Plasters, Bases & Accessories Folder SA-917 for lath and plaster specifications; Paint Products Folder SA-933 for paint specifications. See USG Shaft Wall Manual CS-8 for installation directions.

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

- a. In cold weather during joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.
- b. When low humidity, high temperatures and rapid drying conditions exist during IMPERIAL Gypsum Base and Plaster application, DURABOND Joint Compound and PERF-A-TAPE Reinforcement shall be used on all joints, internal corners, trim and corner beads and allowed to set and dry thoroughly before plaster application.

1.5 protection

All materials shall be suitably protected from the weather during installation to prevent damage to the shaft wall.

Part 2: products

2.1 materials

- a. Liner Board—1" USG Gypsum Shaft Wall Liner, beveled edge, 24" wide, lengths as required.
- b. Faceboards—(½") (½") thick, 48" wide, SHEETROCK FIRECODE "C" Gypsum Panels, lengths as required.
- c. Gypsum Base—(½") (½") thick, 48" wide, square-edge IMPERIAL FIRECODE "C" Gypsum Base, lengths as required.
- d. Joint Treatment—DURABOND Joint Compound and PERF-A-TAPE Reinforcing Tape.
- e. Fasteners—USG Brand Screws: $\frac{3}{8}$ " Type (S) (S-12) pan head; (1") (1 $\frac{1}{8}$) (2 $\frac{1}{4}$) Type S bugle head.
- f. USG Metal Trim—No. (200A) (200B) (401) (402) (701B) (801B).
- g. USG Corner Bead—(DUR-A-BEAD) (No. 800) (No. 900).
- h. USG Control Joint No. 093.
- i. USG Metal Furring Channel.
- j. RC-1 SHEETROCK Resilient Channels.
- k. USG Steel C-H Studs, (212CH5) (212CH8) (400CH5) (400CH10) hot-dipped galvanized, lengths as required (select from tables).

- I. USG Steel E-Studs (212ES5) (212ES10) (400ES5) (400ES10) hot-dipped galvanized, lengths as required (select from tables).
- m. USG Steel J-Runners, (212JR7) (400JR7) hot-dipped galvanized, lengths as required (select from tables).
- n. Runner Fasteners, power-driven type, to withstand 193 lbs. single shear and 200 lbs. bearing force when driven through structural head or base and without exceeding allowable design stress in runner, fastener or structural support (not available from U.S.G.).
- o. USG Acoustical Sealant.

Part 3: execution

3.1 cavity shaft wall erection

Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and 24" o.c. With steel frame construction, install floor and ceiling runners and J-Runners or E-Studs on columns before steel is fireproofed. Remove spray-fireproofing from runners and E-Studs before installing shaft wall liner.

Cut liner board panels 1" less than floor-to-ceiling height and erect vertically between J-Runners. Where shaft walls exceed 14 ft. in height, position liner panel end joints within upper and lower third points of wall. Stagger joints top and bottom in adjacent panels.

Use steel C-H-studs $\frac{3}{8}$ " to not more than $\frac{1}{2}$ " less than floor-to-ceiling height, and install between liner panels with liner inserted in the groove. Install full-length steel E-Studs or J-Runners vertically at T-intersections, corners, door jambs, and columns. Install full-length E-Studs over shaft wall liner both sides of closure panels. Frame openings cut within a liner panel with J-Runner around perimeter. For openings, frame with vertical E-Stud or J-Runner at edges, horizontal J-Runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall.

Install floor-to-ceiling steel E-Studs each side of steel hinged door frames and J-Runners or E-Studs each side of elevator door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two $\frac{3}{8}$ " type S-12 pan head screws. Over metal doors, install a cut-to-length section of J-Runner and attach to strut-studs with clip angles and $\frac{3}{8}$ " type S-12 screws.

Install RC-1 Resilient Channels horizontally to face of studs, within 6" of floor and ceiling and max. 24" o.c. Attach channels to studs with $\frac{3}{8}$ " type S-12 screws driven through holes in mounting flange. Extend channels into all corners and attach to corner framing. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice. Install $\frac{1}{2}$ " x 3" wide continuous gypsum filler strips to top and bottom runner.

For resiliently attached finish, apply base layer horizontally to resilient channels with end joints staggered; fasten with 1" type S screws 12" o.c. Apply face layer vertically with joints staggered and attach to channels with $\frac{1}{8}$ " type S screws 12" o.c.

For double-layer finish, erect $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panel base layer horizontally one side of studs with end joints staggered. Fasten base layer panels to studs with 1" type S screws 24" o.c. Caulk perimeter of base layer panels.

Apply $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panel face layer vertically over base layer with joints staggered and at-

tached with $1\frac{1}{8}$ " type S screws staggered from those in base, spaced 12" o.c. and driven into studs.

Where both sides of shaft wall are finished, apply $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panel face layers vertically both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1" type S screws spaced 12" o.c. in field and along edges.

For triple-layer finish, erect base layer vertically one side of studs, mid layer horizontally with joints staggered and face layer vertically with joints staggered. Attach gypsum panels to studs with 1" type S screws 24" o.c. for base layer, $1\frac{1}{8}$ " type S screws 24" o.c. for mid layer and $2\frac{1}{4}$ " type S screws 16" o.c. for face layer. Attach face panels to J-Runners with $2\frac{1}{4}$ " type S screws 12" o.c.

Note—For 4-hr. assembly, erect steel runners, steel studs and liner panels as described in first four paragraphs, then continue construction as described below:

Position second layer liner panels vertically over studs and fasten to studs with $1\frac{1}{8}$ " type S screws spaced 6" from top and bottom and 24" o.c. Apply $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panel layer vertically over liner panels and attach with $2\frac{1}{4}$ " type S screws staggered from screws in liner panel layer, spaced 24" o.c. and driven into studs.

Install USG Metal Furring Channels horizontally over gypsum panel layer at ceiling and spaced 24" o.c. vertically. Fasten top channel to studs and runner with $2\frac{1}{4}$ " type S screws spaced 12" o.c. and alternated on channel flanges. Fasten other channels to studs with screws spaced 24" o.c. in top channel flange.

Install second layer $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels vertically over furring channels with vertical joints staggered 24" from joints in first layer. Fasten panels to channels with 1" type S screws spaced 1" from vertical edges, 12" o.c. in top channel and 24" o.c. in other channels. Install face layer panels vertically over second layer with vertical joints staggered 24". Fasten panels to furring channels with $1\frac{1}{8}$ " type S screws located $\frac{3}{4}$ " and 6" from edges and spaced 12" o.c. in between.

3.2 accessory application

a. **Gypsum Panel Joints**—Finish all face layer joints and internal angles with DURABOND Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

b. **Gypsum Base Joints**—Treat all gypsum base joints, internal corners, trim and corner bead with DURABOND Joint System installed according to manufacturer's directions. Allow to dry thoroughly before finish plaster application.

c. **Corner Bead**—Reinforce all vertical and horizontal exterior corners with corner bead fastened with staples 9" o.c. on both flanges along entire length of bead.

d. **Metal Trim**—Where shaft wall terminates against masonry or other dissimilar material, apply metal trim over face layer edge and fasten with screws or staples spaced 12" o.c.

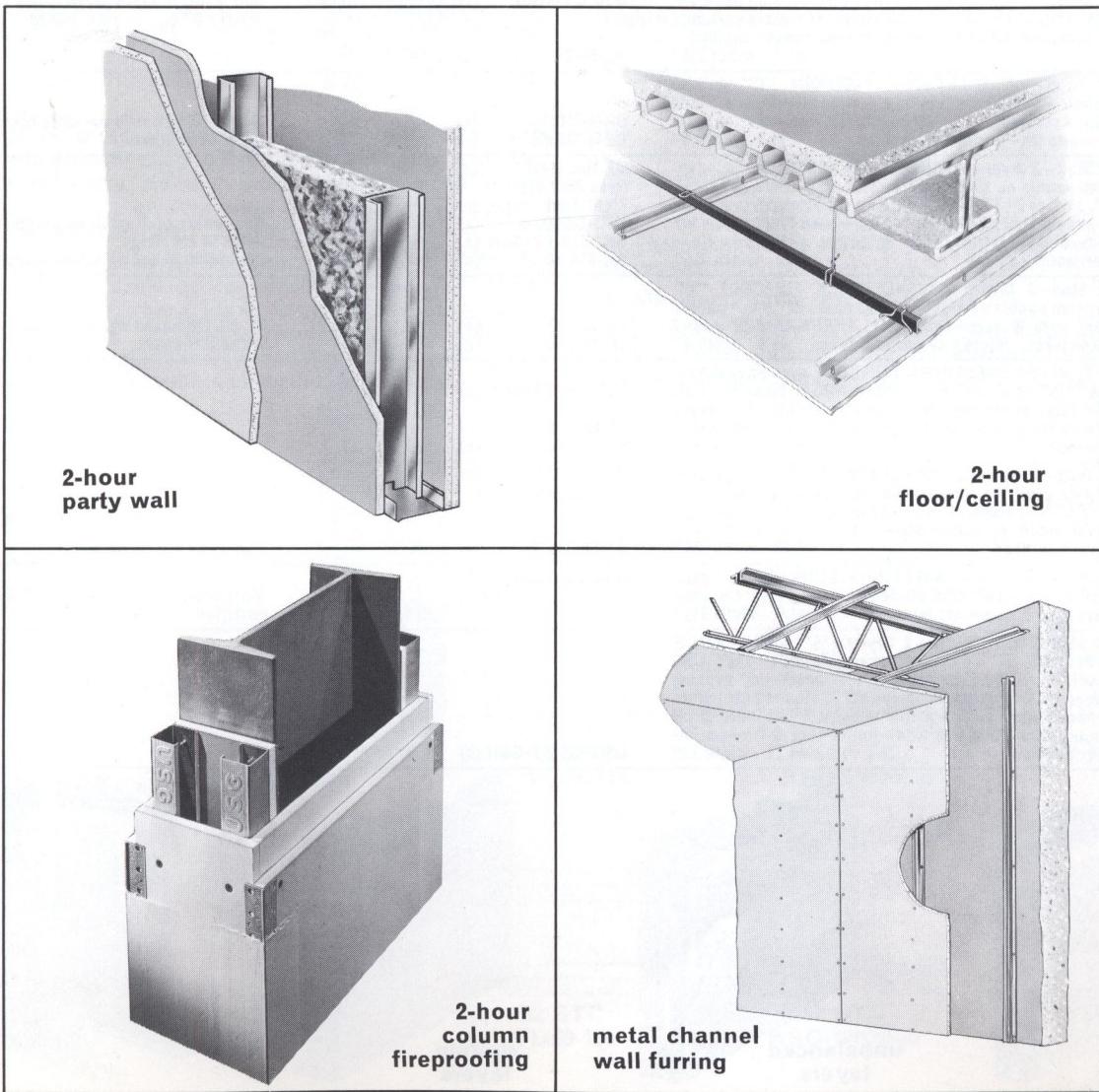
e. **Screws**—Power-drive at least $\frac{3}{8}$ " from edges or ends of gypsum panels to provide uniform dimple $\frac{1}{32}$ " deep. In gypsum base, set flush with surface without tearing face paper.

f. **Control Joints**—Break face layer behind joint. Attach control joint to face layer with staples spaced 6" o.c. on both flanges along entire length of joint.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE, PERF-A-TAPE, DURABOND, DUR-A-BEAD, THERMAFIBER, IMPERIAL.

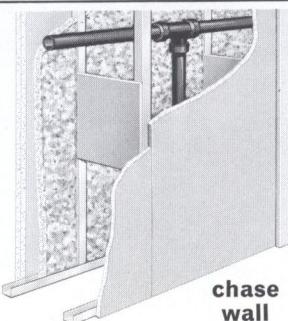
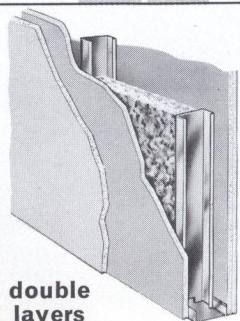
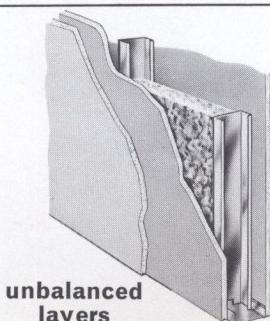
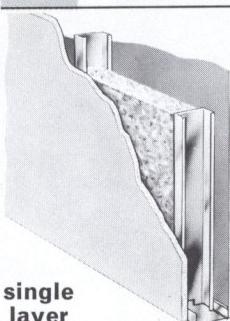
NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

**lightweight, fire and sound-resistant assemblies for partitions,
ceilings, column fireproofing, wall furring**



partitions/test data

fire rating	description	test no.	stc rating	comments	
			11-f 16-f		
1 hr.	Met Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2½" USG studs 24" o.c.—single layer panels ea side appl vert & screw att—1½" THERMAFIBER sound atten blkts one side—joints fin—perimeter caulked wt 5 width 3½"	T-3362-OSU TL-69-42 TL-65-158	(f) (s) (s)	45 47	TL-65-158 based on 3½" studs & 1" blkts.
1 hr. est	Met Stud—½" SHEETROCK FIRECODE gypsum panels—2½" USG studs 24" o.c.—1½" THERMAFIBER sound atten blkts—2 layer—base layer ¼" SHEETROCK panels screw att—½" face layer screw att—joints fin—perimeter caulked wt 7 width 4½"	CK-684-14 CK-684-13	(s) (s)	55 53	CK-684-13 based on ½" thick panels
1 hr. est	Met Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2½" USG studs 24" o.c.—single layer panels one side appl vert & screw att—1½" THERMAFIBER sound atten blkts one side—2 layers opp side—panels appl vert & screw att—joints stag & fin—perimeter caulked wt 7 width 4"	BBN-711005 TL-69-153 TL-69-148 BBN-700726	(s) (s) (s) (s)	50 49 41 51	BBN-711005 based on lamin. face layer. TL-69-148 based on same construction without blankets. BBN-700726 based on 2½" foil-faced blkts.
1 hr. est	Met Stud—½" SHEETROCK FIRECODE "C" gypsum panels—3½" USG studs 24" o.c.—single layer panels one side appl vert & screw att—2" THERMAFIBER sound atten blkts one side—2 layers opp side—panels appl vert & screw att—joints stag & fin—perimeter caulked wt 8 width 5½"	USG-241-ST-G&H	(s)	50	
1 hr.	Met Stud—2 layers ½" SHEETROCK gypsum panels ea side—1½" USG studs 24" o.c.—panels appl vert & screw att—joints stag & fin—perimeter caulked wt 9 width 3½"	U of C 9-21-64 CK-654-40	(f) (s)		Sound test based on 2½" studs & 1½" blankets
1 hr.	Met Stud—½" SHEETROCK FIRECODE gypsum panels—3½" USG studs 24" o.c.—single layer panels vert or horiz appl & screw att 12" o.c.—joints fin—perimeter caulked wt 6 width 4½"	T-1174-OSU GA-WP-45-1 hr USG-17-FT-G&H	(f) (f) (s)		Basic 1-hr. corridor—fire tests based on screws 8" o.c. at vert. joints—WP-45 based on horizontal application
1 hr.	Met Stud—½" SHEETROCK FIRECODE gypsum panels—1½" USG studs 24" o.c.—single layer panels vert appl & screw att 12" o.c.—joints fin—perimeter caulked wt 5 width 2½"	U of C 7-31-62 TL-64-29	(f) (s)		Min. 1-hr. drywall partn.—fire test based on screws 8" o.c. at vert. joints
1 hr. est	Met Stud—½" SHEETROCK FIRECODE "C" gypsum panels—3" USG studs 24" o.c.—single layer panels vert appl & screw att—1½" THERMAFIBER sound atten blkts—joints fin—perimeter caulked wt 5 width 4"	BBN-710310 BBN-710305	(s) (s)	45 39	BBN-710305 based on same construction without blankets
2 hrs.	Met Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2½" or 3½" USG studs 24" o.c.—1", 1½" or 2" THERMAFIBER sound atten blkts stapled—panels appl vert & joints stag—base layer screw att—face layer strip lamin or screw att—joints fin—perimeter caulked wt 10 width 4½"	UL Des U412 (was 28-2 hr) Field Test KSO-109006-a USG-114-FT-G&H CK-654-40	(f) (s) (s) (s)	55 54 53	Best value of drywall metal stud party walls in 50-54 stc range. CK-654-40 based on screw-attached face layer
2 hrs. est	Met Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2" USG studs 24" o.c.—panels appl vert & screw att—1½" THERMAFIBER sound atten blkts—joints fin—perim caulked wt 9 width 4"	TL-69-159 TL-69-155	(s) (s)	52 45	TL-69-155 based on same construction without blankets
2 hrs. est	Met Stud—½" SHEETROCK FIRECODE gypsum panels—3½" USG studs 24" o.c.—2 layer—base layer ½" USG min fiber sound dead bd ea side screw att—face layer panels lamin & screw att—joints stag & fin—perimeter caulked wt 8 width 5½"	USG-103-FT-G&H Field Test KSO-109006-b	(s) (s)	52 50	
2 hrs.	Met Stud—2 layers ½" SHEETROCK FIRECODE gypsum panels plain or vinyl faced vert appl ea side—2½" or 3½" USG studs 24" o.c.—base layer screw att—face layer lamin or screw att—joints fin or unfin—perimeter caulked wt 12 width 6½"	UL Des U411 (was 11-2 hr)	(f)		Excellent for corridors
2 hrs.	Met Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels—1½" USG studs 24" o.c.—2 layers ea side vert appl & screw att joints fin wt 9 width 3½"	TL-60-113 U of C 6-15-65	(s) (f)	46 N/A	Most economical 2-hour steel stud drywall partition
2 hrs. est	Met Stud Chase Wall—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—1½" USG studs 24" o.c. in 2 rows spaced 6¾" apart—½" gypsum panel gussets spanning chase att to studs at qtr points—panels appl vert & screw att—1½" THERMAFIBER sound atten blkts one side—joints stag & fin—perimeter caulked wt 11 width 12"	USG-134-FT-G&H	(s)	55	



partitions

description

These lightweight, fire and sound-resistant assemblies consist of one or two layers of SHEETROCK Gypsum Panels screw-attached to metal framing. A specially designed self-tapping steel screw with a rust-inhibitive coating is used to attach the panels to the framing. The systems are completed with a U.S.G. joint system and decorating—both steps unnecessary in walls when predecorated vinyl-surfaced TEXTONE Gypsum Panels are used.

Gypsum panels for these assemblies are available in three thicknesses and six types (see Specifications). In two-layer construction USG Mineral Fiber Sound Deadening Board may be used as a base layer. SHEETROCK FIRECODE and FIRECODE "C" Gypsum Panels, with a specially formulated core, obtain higher fire ratings than regular SHEETROCK Panels (see table, page 2). These versatile panels are applied to USG Steel Studs or Metal Furring Channels to meet design requirements for fixed interior partitions—divider, corridor, party and chase walls; furred and suspended ceilings; wall furring and column fireproofing, as outlined below:

1. Partitions—Single layer of $\frac{1}{2}$ " or $\frac{5}{8}$ " thick SHEETROCK FIRECODE "C" Gypsum Panels applied to USG Steel Studs, set in runners, provides economical 1-hour fire-rated partitioning for corridors or within units. The studs are available in seven widths and two types (see Specifications, page 16) and lengths to suit job requirements. With double-layer $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels attached to $2\frac{1}{2}$ " or $3\frac{3}{8}$ " studs spaced 24" o.c., a 2-hour fire rating plus sound control suitable for party walls is available. Where added partition width is required, double rows of studs are erected to provide chase walls with up to $20\frac{3}{4}$ " net pipe chase width (see page 7).

Shaft Walls—SHEETROCK Panels, assembled with gypsum shaft wall liner and specially shaped C-H Studs, offer systems ideally suited for enclosing elevator shafts, stairwells and other vertical shafts in core areas of multi-story buildings (see separate Shaft Wall Folder SA-922 for applications).

2. Ceilings—Single-layer $\frac{5}{8}$ " SHEETROCK FIRECODE "C" Panels screw-attached to furred or suspended USG Metal Furring Channels 24" o.c. provide a 3-hour fire rating including beam protection (see page 15). The systems are also suitable for separate beam protection and for exterior ceilings and soffits with USG Exterior Gypsum Ceiling Board facings.

USG Metal-Framed Drywall Systems

3. Wall Furring—With Foil-Back SHEETROCK Panels screwed to USG Metal Furring Channels, this construction provides an excellent vapor barrier and offers significant insulating value as exterior wall furring (see page 10). SHEETROCK Panel application to USG Z-Furring Channels with semi-rigid insulation provides a fully insulated wall at a cost competitive with many non-insulated furred walls (see page 11).

4. Column Fireproofing—SHEETROCK FIRECODE "C" Gypsum Panels, held in place by a combination of wire, screws, steel studs, corner bead and joint compound, offer lightweight, compact fire protection for steel columns (see page 9).

function and utility

Adaptable to virtually every type of new construction—commercial, institutional, industrial and residential—or in modernization to provide smooth, durable interior surfaces.

Fire Resistant—Constructed of noncombustible components. Established fire ratings available to meet design requirements; partitions up to 2 hours, ceilings up to 3 hours including beam, column fireproofing up to 4 hours.

Sound Isolation—STC ratings up to 55 for double-layer and 48 for single-layer partitions; 54 for single-layer ceilings. THERMAFIBER Sound Attenuation Blankets are used where greater sound isolation is desired.

Lightweight—These thin drywall assemblies weigh only 5 to 12 psf, reduce dead load and save floor area.

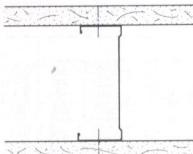
Economical—Low material cost and speed of erection provide realistic and competitive construction costs.

limitations

1. Non-load bearing.
2. These assemblies should not be used where exposed to excessive moisture or humidity.
3. Maximum frame spacing is 24" o.c.
4. In ceiling design, certain precautions concerning construction, isolation and ventilation are necessary for good performance (see Specifications, page 16).

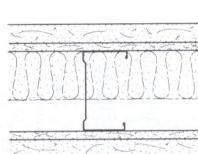
sound-tested assemblies

single layer

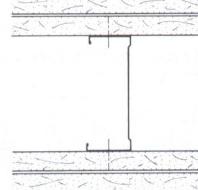


42 STC
USG-17-FT G & H

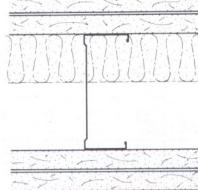
double layer



55 STC
CK-684-14

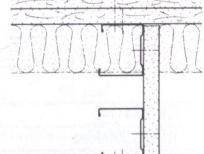


46 STC
TL-60-113

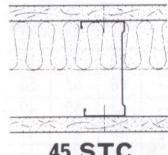


54 STC
KSO-109006-a

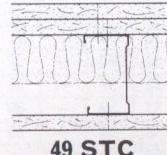
chase wall



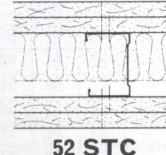
55 STC
USG-134-FT G & H



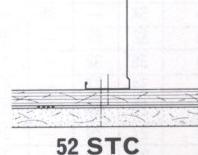
45 STC
BBN-710310



49 STC
TL-69-153



52 STC
TL-69-159



52 STC
KSO-109006-b

technical data

structural properties

stud width	I in. ⁴ x-x	S in. ³ x-x	R in. x-x
USG Steel Studs (ST5)			
1 $\frac{1}{8}$ "	0.043	0.047	0.689
2"	0.069	0.062	0.837
2 $\frac{1}{2}$ "	0.115	0.082	1.028
3"	0.174	0.105	1.213
3 $\frac{5}{8}$ "	0.269	0.135	1.304
4"	0.338	0.154	1.316
6"	0.324	0.146	1.481
USG Steel Studs (ST10)			
2"	0.126	0.123	0.820
2 $\frac{1}{2}$ "	0.210	0.164	1.012
3"	0.320	0.209	1.197
3 $\frac{5}{8}$ "	0.497	0.269	1.422
4"	0.626	0.307	1.553
6"	0.864	0.396	2.076

limiting height—chase wall partitions

stud style	stud width	stud spacing	allow. defl.	one layer	two layers
158ST5	1 $\frac{1}{8}$ "	16"	1/120 1/240	15'9" ^f 14'0" ^d	15'9" ^f 14'0" ^d
		24"	1/120 1/240	13'0" ^f 12'3" ^d	13'0" ^f 12'3" ^d
212ST5	2 $\frac{1}{2}$ "	16"	1/120 1/240	21'0" ^f 18'6" ^d	21'0" ^f 20'3" ^d
		24"	1/120 1/240	17'0" ^f 16'3" ^d	17'0" ^f 17'0" ^f
358ST5	3 $\frac{5}{8}$ "	16"	1/120 1/240	26'9" ^f 23'9" ^d	26'9" ^f 25'9" ^d
		24"	1/120 1/240	22'0" ^f 20'9" ^d	22'0" ^f 22'0" ^f

Limiting height for $\frac{1}{2}$ " or $\frac{3}{8}$ " thick panels and 5 psf uniform load perpendicular to partition. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

limiting height—steel stud assemblies

stud style	stud width	stud spacing	allow. defl.	partition, one layer	partition, two layers	furring, one layer
USG Steel Studs (ST5)						
158ST5	1 $\frac{1}{8}$ "	16"	1/120 1/240	11'3" ^f 10'0" ^d	11'3" ^f 11'3" ^f	10'0" ^f 8'6" ^d
		24"	1/120 1/240	9'3" ^f 8'9" ^d	9'3" ^f 9'3" ^f	8'3" ^f 7'6" ^d
20ST5	2"	16"	1/120 1/240	12'9" ^f 11'3" ^d	12'9" ^f 12'6" ^d	10'0" ^d
		24"	1/120 1/240	10'6" ^f 10'0" ^d	10'6" ^f 10'6" ^f	9'3" ^f 8'9" ^d
212ST5	2 $\frac{1}{2}$ "	16"	1/120 1/240	14'9" ^f 13'0" ^d	14'9" ^f 14'3" ^d	12'6" ^f 11'6" ^d
		24"	1/120 1/240	12'0" ^f 11'6" ^d	12'0" ^f 12'0" ^f	8'3" ^f 7'6" ^d
30ST5	3"	16"	1/120 1/240	16'9" ^f 14'9" ^d	16'9" ^f 16'0" ^d	13'9" ^f 13'3" ^d
		24"	1/120 1/240	13'9" ^f 13'0" ^d	13'9" ^f 13'9" ^f	11'3" ^f 11'3" ^f
358ST5	3 $\frac{5}{8}$ "	16"	1/120 1/240	19'0" ^f 16'9" ^d	19'0" ^f 18'0" ^d	15'3" ^f 15'3" ^d
		24"	1/120 1/240	15'6" ^f 14'9" ^d	15'6" ^f 15'6" ^f	12'6" ^f 12'6" ^f
40ST5	4"	16"	1/120 1/240	20'3" ^f 18'0" ^d	20'3" ^f 19'3" ^d	16'3" ^f 16'3" ^f
		24"	1/120 1/240	16'6" ^f 15'9" ^d	16'6" ^f 16'6" ^f	13'3" ^f 13'3" ^f
60ST5	6"	16"	1/120 1/240	19'9" ^f 19'9" ^f	19'9" ^f 19'9" ^f	15'0" ^f 15'0" ^f
		24"	1/120 1/240	16'0" ^f 16'0" ^f	16'0" ^f 16'0" ^f	12'3" ^f 12'3" ^f

USG Steel Studs (ST10)

stud style	stud width	stud spacing	allow. defl.	partition, one layer	partition, two layers	furring, one layer
20ST10	2"	16"	1/120 1/240	16'0" ^d 12'9" ^d	17'3" ^d 13'9" ^d	14'9" ^d 11'9" ^d
		24"	1/120 1/240	14'0" ^d 11'0" ^d	14'9" ^f 12'0" ^d	12'9" ^d 10'3" ^d
212ST10	2 $\frac{1}{2}$ "	16"	1/120 1/240	17'6" ^d 13'9" ^d	19'9" ^d 15'9" ^d	17'3" ^d 13'9" ^d
		24"	1/120 1/240	15'3" ^d 12'0" ^d	17'0" ^f 13'9" ^d	14'6" ^f 12'0" ^d
30ST10	3"	16"	1/120 1/240	21'0" ^d 16'9" ^d	22'3" ^d 17'9" ^d	19'9" ^d 15'9" ^d
		24"	1/120 1/240	18'6" ^d 14'6" ^d	19'3" ^f 15'6" ^d	17'3" ^d 13'9" ^d
358ST10	3 $\frac{5}{8}$ "	16"	1/120 1/240	23'0" ^d 18'3" ^d	25'3" ^d 20'0" ^d	21'9" ^f 18'0" ^d
		24"	1/120 1/240	20'0" ^d 16'0" ^d	21'9" ^f 17'6" ^d	17'9" ^f 15'9" ^d
40ST10	4"	16"	1/120 1/240	24'9" ^d 19'6" ^d	27'0" ^d 21'6" ^d	24'9" ^f 21'6" ^d
		24"	1/120 1/240	21'6" ^d 17'0" ^d	23'3" ^f 18'9" ^d	20'3" ^f 18'9" ^d
60ST10	6"	16"	1/120 1/240	27'6" ^d 21'9" ^d	32'0" ^d 25'6" ^d	24'9" ^f 21'6" ^d
		24"	1/120 1/240	24'0" ^d 19'0" ^d	26'6" ^f 22'3" ^d	20'3" ^f 18'9" ^d

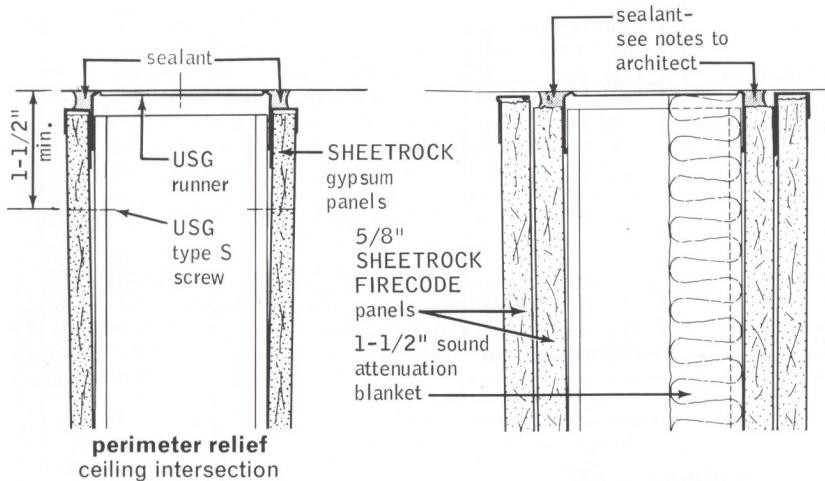
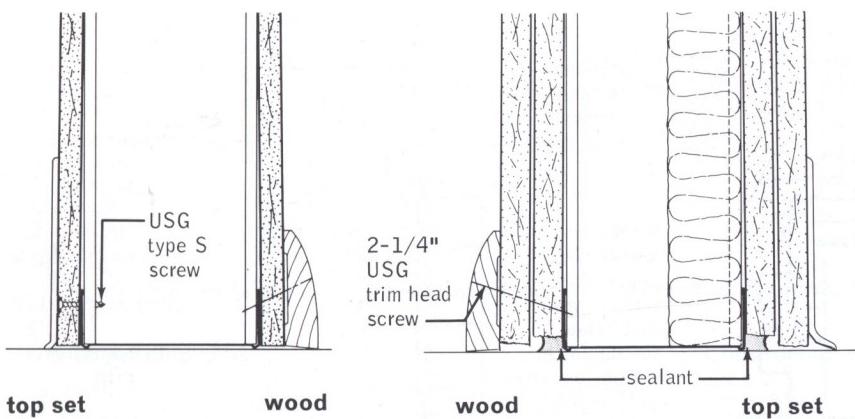
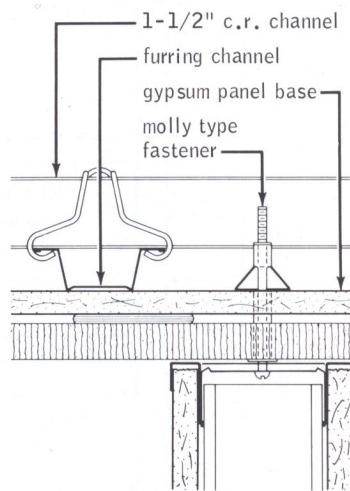
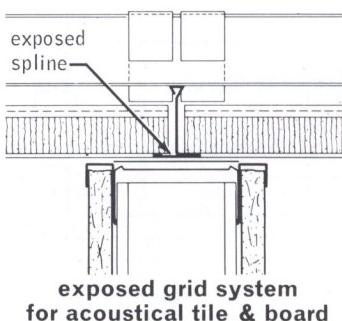
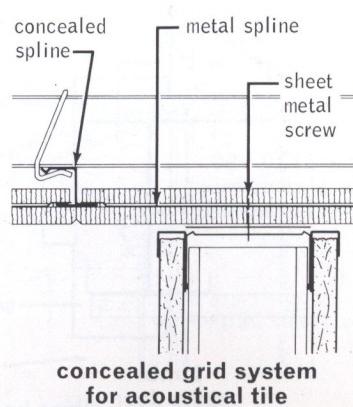
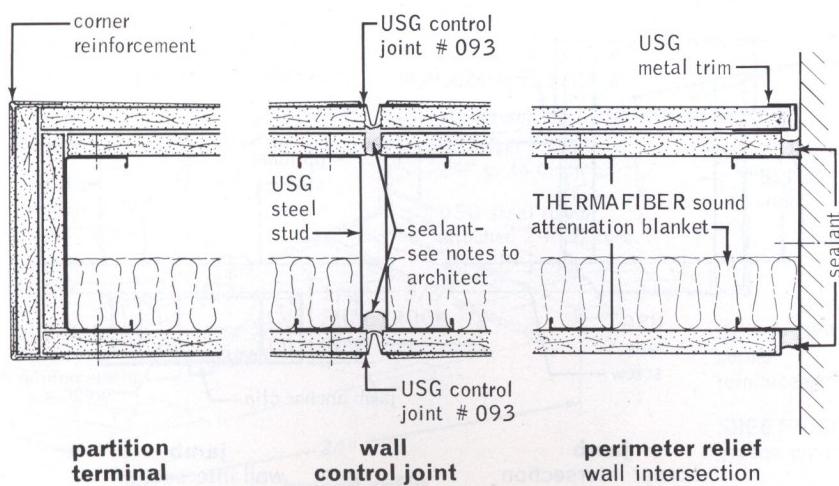
Limiting height for $\frac{1}{2}$ " or $\frac{3}{8}$ " thick panels and 5 psf uniform load perpendicular to partition or furring. Limiting criteria: d—deflection, f—bending stress. Consult local code authority or limiting criteria.

sound transmission loss—db

test no.	method	band center frequency—Hz																			STC		
		125	160	175	200	250	315	350	400	450	500	600	630	700	800	1000	1250	1400	1600	2000	2500		
CK-684-14	Lab	31	40	—	41	47	50	—	53	57	59	—	60	63	63	—	62	60	59	—	61	65	55
KSO-109006-a	Field	36	—	47	—	47	—	49	—	51	—	53	—	57	—	59	—	57	—	55	—	62	55
USG-134-FT-G&H	Lab	33	—	43	—	48	—	49	—	56	—	57	—	60	—	60	—	63	—	60	—	60	55
USG-114-FT-G&H	Lab	32	—	39	—	44	—	48	—	55	—	56	—	57	—	59	—	62	—	58	—	56	54
CK-684-13	Lab	29	38	—	40	46	49	—	54	56	58	—	60	62	63	—	61	62	61	—	63	64	53
CK-654-40	Lab	36	35	—	37	43	47	—	51	54	55	—	57	56	56	—	59	58	58	—	56	58	53
TL-69-159	Lab	30	37	—	40	42	48	—	52	53	54	—	55	57	58	—	60	59	52	—	49	52	52
KSO-109006-b	Field	31	—	37	—	42	—	44	—	51	—	54	—	59	—	59	—	58	—	55	—	63	50
USG-103-FT-G&H	Lab	34	—	36	—	44	—	46	—	52	—	56	—	57	—	60	—	53	—	53	—	55	52
BBN-700726	Lab	32	33	—	38	44	45	—	49	52	52	—	57	59	58	—	61	62	54	—	51	51	51
BBN-711005	Lab	35	32	—	40	45	49	—	52	51	48	—	51	51	50	—	52	52	49	—	48	52	50
USG-241-ST-G&H	Lab	34	37	—	41	41	44	—	47	50	54	—	55	56	57	—	58	49	46	—	46	45	50
TL-69-153	Lab	28	36	—	37	38	44	—	48	52	54	—	55	57	59	—	60	58	51	—	47	49	49
TL-65-158	Lab	27	29	—	35	37	40	—	43	48	52	—	53	52	54	—	55	54	49	—	44	47	47
BBN-710310	Lab	27	30	—	34	37	40	—	44	45	47	—	49	49	49	—	49	45	41	—	43	45	45
TL-69-42	Lab	21	29	—	32	35	40	—	45	48	51	—	53	55	57	—	58	56	49	—	42	43	45

details

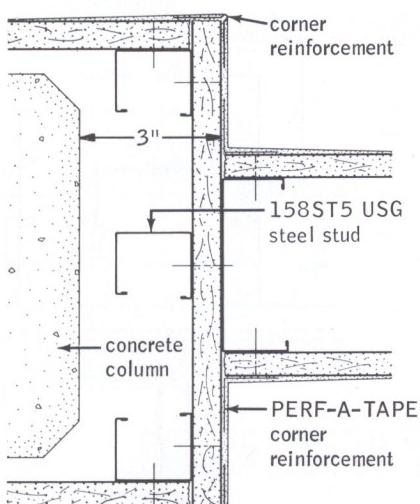
scale: 3" = 1'-0"

ceiling attachments**floor attachments****attachment of partition to ceiling****adhesively applied acoustical tile****wall plan sections**

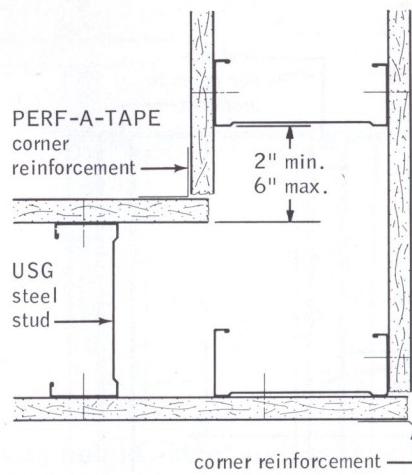
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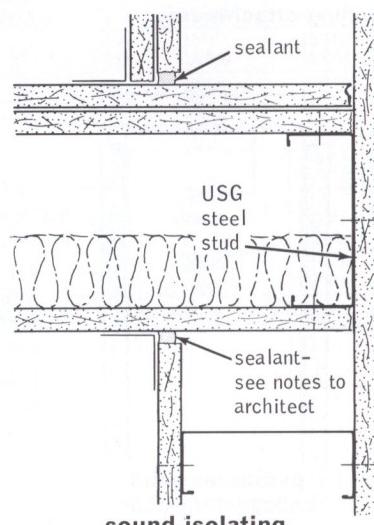
wall plan sections



partition relief
column intersection

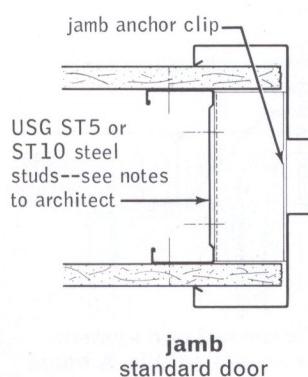


partition corner

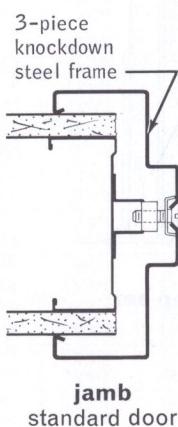


sound-isolating
partition intersection

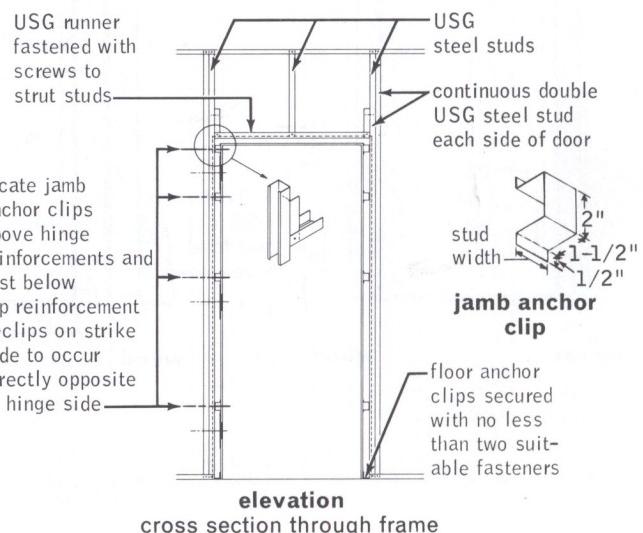
metal door frames



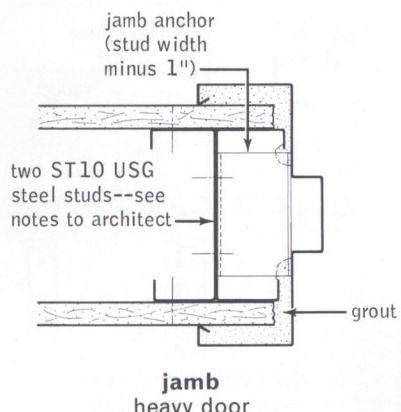
jamb
standard door



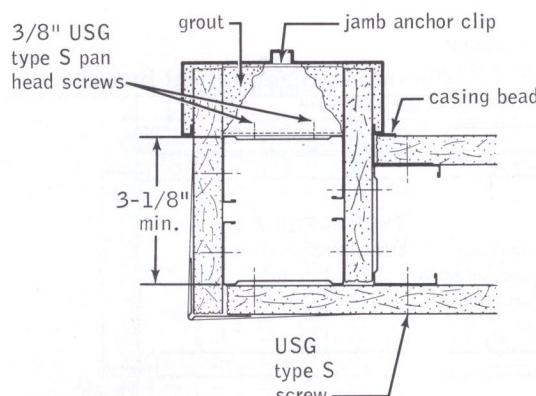
jamb
standard door



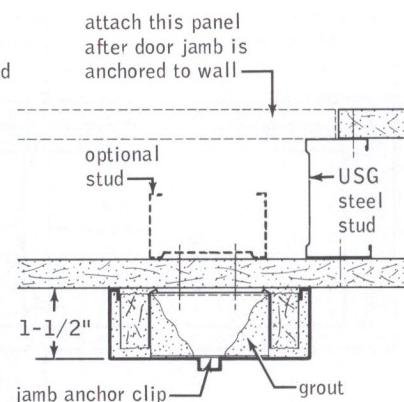
elevation
cross section through frame



jamb
heavy door



jamb
corner intersection



jamb
wall intersection

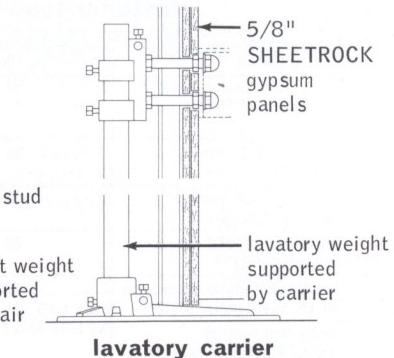
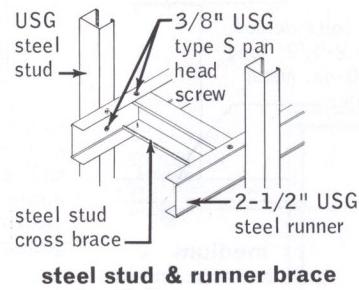
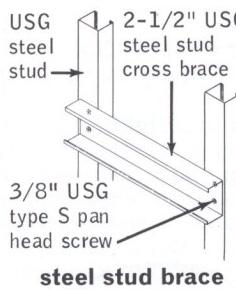
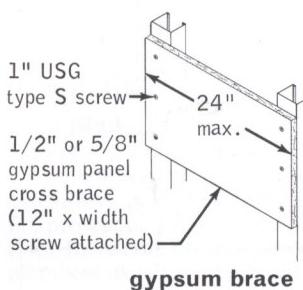
details

USG steel stud chase wall

Chase walls provide vertical shafts where greater core widths are needed for pipe chase enclosures and other service installations. They consist of a double row of steel studs with gypsum panel cross braces between rows. Double-layer $\frac{1}{2}$ " SHEETROCK Gypsum Panels are screw-applied on both sides of studs and $1\frac{1}{2}$ " THERMAFIBER Sound Attenuation Blankets are stapled to the back side of one base layer. The assembly offers 55 STC, suitable for party walls, and a 2-hour fire-resistance rating when $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels are used.

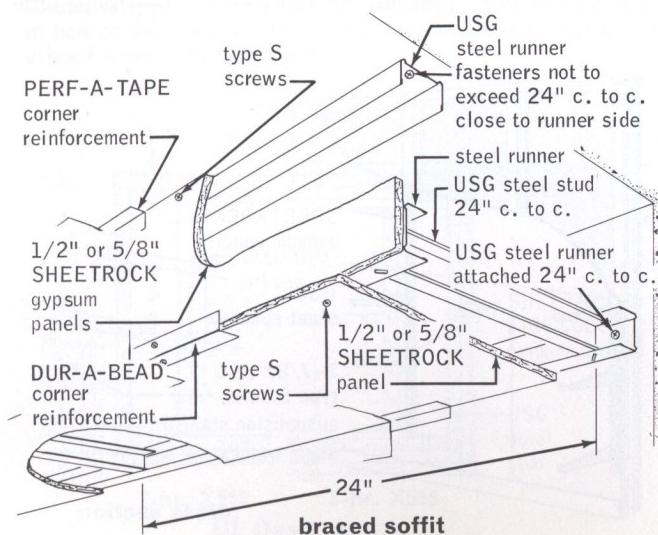
As an alternate, $2\frac{1}{2}$ " steel stud cross braces screw-attached to chase wall studs may be used. When chase wall studs are not directly opposite, steel stud cross braces 24" o.c. are anchored to continuous horizontal $2\frac{1}{2}$ " runners screw-attached to chase wall studs.

Limiting thickness is 24"; vertical brace spacing 48" o.c. max.; limiting heights are shown on page 4. Other chase walls providing greater height may be constructed with wider or heavier steel studs (see tables, page 4, for design data). Minimum panel size is $\frac{1}{2}$ " x 4' x ceiling height.



USG drywall soffit

This assembly consists of galvanized steel channel runners and studs faced with SHEETROCK Gypsum Panels, screw attached. It is a lightweight, fast and economical method of filling over cabinets or lockers and of housing overhead ducts, pipes or conduits. The braced system permits constructing soffits with depths of 48" and widths to 72" without supplementary vertical studs. The unbraced system is for soffits up to 24" x 24".

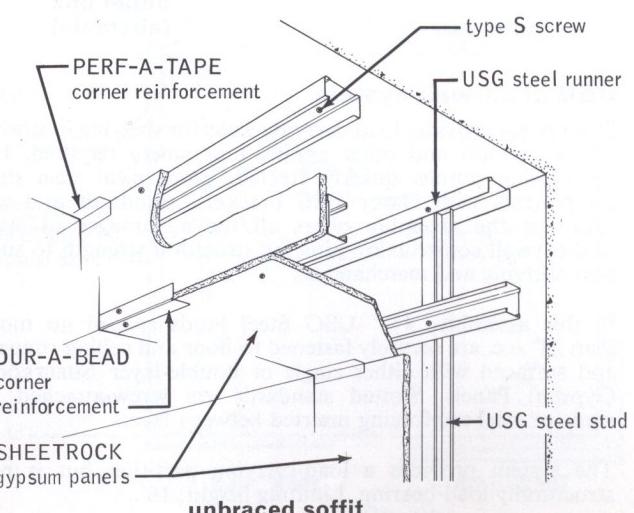


Construction recommendations—maximum dimensions (1):

gypsum board thickness (2)	steel stud size	maximum width	max. depth for max. width shown
$\frac{1}{2}$ "	$1\frac{1}{8}$ "	60"	48"
$\frac{1}{2}$ "	$2\frac{1}{2}$ ", $3\frac{1}{8}$ "	72"	36"
$\frac{5}{8}$ "	$1\frac{1}{8}$ "	60"	30"
$\frac{5}{8}$ "	$2\frac{1}{2}$ ", $3\frac{1}{8}$ "	72"	18"

(1) The construction is not designed to support loads other than its own dead weight and should not be used where it may be subjected to excessive abuse.

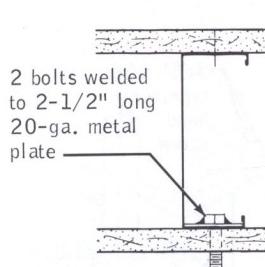
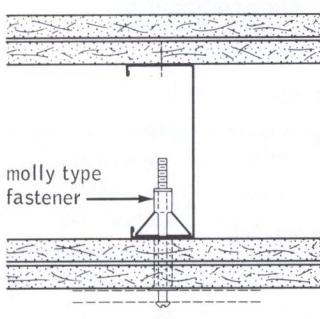
(2) The double-layer system and $\frac{5}{8}$ " thick gypsum panels are not recommended for this construction.



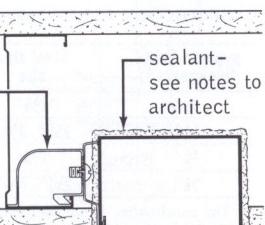
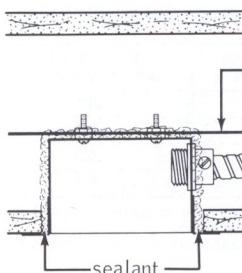
fixture attachments

fastener load table

type fastener or attachment	allowable withdrawal resistance—lbs.	allowable shear resistance—lbs.
No. 8 sheet metal screw through SHEETROCK into steel stud	50	80
1/4" molly bolt into 1/2" SHEETROCK only	35	80
1/4" toggle bolt into 1/2" SHEETROCK only	40	60
No. 8 sheet metal screw in plastic plug	20	40
No. 8 sheet metal screw into 25-ga. sheet metal plate	60	100
molly bolt through SHEETROCK into steel stud 1/8" diam. 3/16" diam.	70 80	100 125
bolts welded to 20-ga. plate 3/16" diam. 1/4" diam.	175 200	200 250
plumber's bracket att. with 1/4" bolts and 1 1/2" channels	200	200



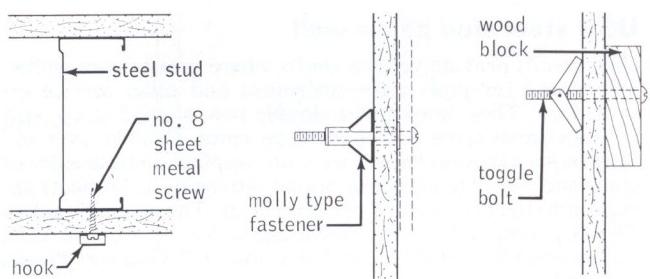
medium



outlet box

outlet box (alternate)

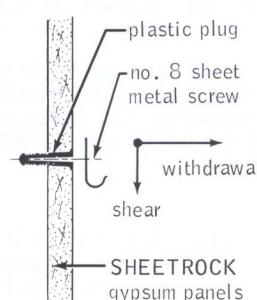
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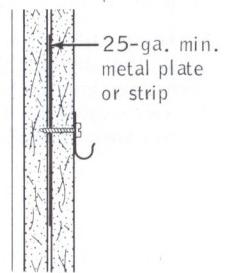
light

light

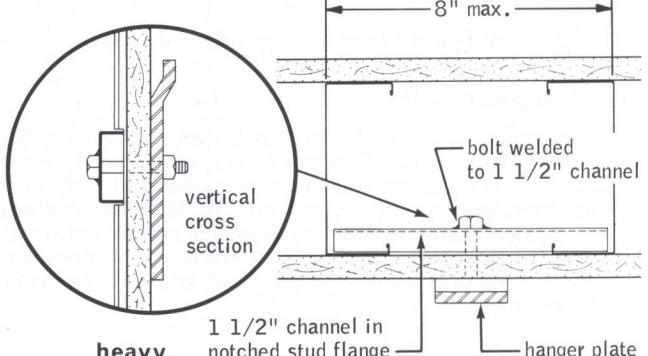
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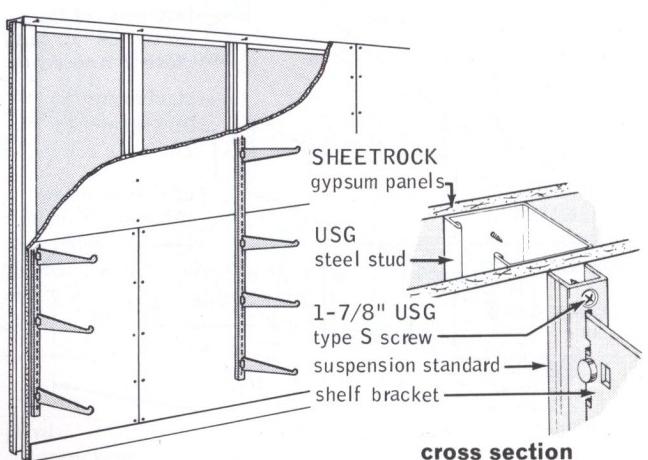
light



light



heavy



cross section

USG shelf-wall system

This system provides load-carrying walls for shelving in stores, offices, schools and other applications where required. Incorporating simple, quickly erected, economical steel stud components with Gacy shelf brackets, standards and accessories, the assembly offers all the advantages of steel stud-drywall construction plus the structural strength to support shelving and merchandise.

In this assembly, 3 5/8" USG Steel Studs spaced no more than 24" o.c. are securely fastened to floor and ceiling runners and surfaced with either single or double-layer SHEETROCK Gypsum Panels. Slotted standards are screw-attached to studs or steel reinforcing inserted between layers.

The system provides a load-carrying partition but is not structurally load-bearing. Limiting height: 16'.

column fireproofing/test data

fire rating	column type	description	test no.	comments
2 hrs.	W10 X49	Gypsum Drywall Fireprfg—½" SHEETROCK FIRECODE "C" panels around col—double layer over ea flange end—double layer on flange faces separ by USG 158ST5 stl studs & screw att—met beads on corners—joints fin†	UL Des X518 (was 10-2 hr)	(f)
2 hrs.	W14 X228	Gypsum Drywall Fireprfg—½" SHEETROCK FIRECODE "C" panels around col—panels screw att to 158ST5 stl studs at col corners—met corner beads—joints fin†	UL Des X521 (was 23-2 hr)	(f)
2 hrs.	varies	Gypsum Drywall Fireprfg—3 layers ½" SHEETROCK FIRECODE "C" panels around col—triple layer over ea flange end—inner layers on flange face separ by 158ST5 stl studs & screw att—met beads on corners—joints fin†	UL Des X524	(f) Rating applies to tapered or constant-section prefabricated metal building columns
3 hrs.	W10 X49	Gypsum Drywall Fireprfg—3 layers ½" SHEETROCK FIRECODE "C" panels around col—triple layer over ea flange end—inner layers on flange face separ by 158ST5 stl studs & screw att—met beads on corners—joints fin†	UL Des X515 (was 41-3 hr)	(f)
3 hrs.	W14 X228	Gypsum Drywall Fireprfg—½" SHEETROCK FIRECODE "C" panels around col—double layer over ea web face—panels screw att to 158ST5 stl studs at col corners—met corner beads—joints fin†	UL Des X514 (was 40-3 hr)	(f)
4 hrs.	W14 X228	Gypsum Drywall Fireprfg—2 layers ½" SHEETROCK FIRECODE "C" panels around col—panels screw att to 158ST5 stl studs at col corners—met corner beads—joints fin†	UL Des X507 (was 48-4 hr)	(f)
4 hrs.	W10 X49	PYROBAR Gypsum Tile & Drywall Fireprfg—3" hol tile around col—tile banded 24" from ea end—contin met angles screw att to bands—1 layer ½" SHEETROCK FIRECODE "C" panels screw att to angles—met corner beads—joints fin†	UL Des X504 (was 34-4 hr)	(f)

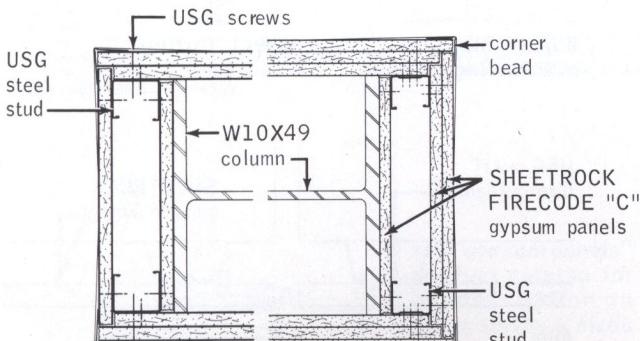
†Fire rating also applies with IMPERIAL FIRECODE "C" Gypsum Base and veneer plaster surface.

description

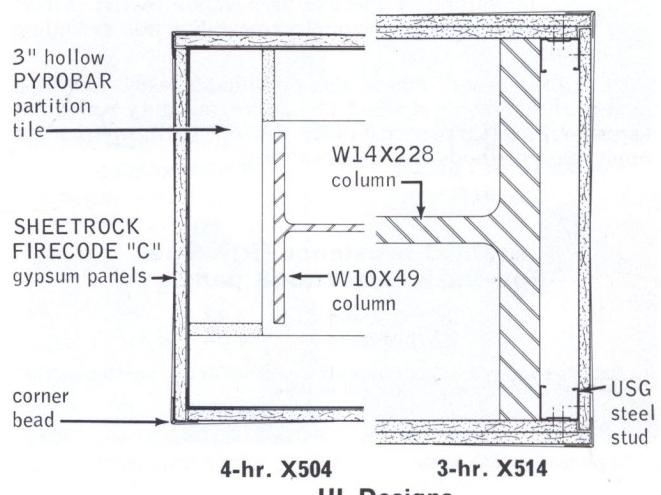
Drywall systems for column fireproofing consist of layers of SHEETROCK FIRECODE "C" Gypsum Panels held in place by a combination of wire, steel studs, screws and metal angles. The assemblies provide lightweight, thin, compact steel column fire protection of up to four hours depending on the construction. Increased fire protection of primary structural framing members usually permits lower insurance premiums.

These systems are easily and quickly installed without waiting for adhesives to dry. In two 4-hour assemblies, the gypsum panel face layer is screw-attached to metal straps applied over a base of 3" hollow PYROBAR Gypsum Partition Tile. To obtain the 3-hour fire rating the gypsum panel layers are screw-attached to steel studs at column corners. DUR-A-BEAD Corner Reinforcement concealed with a U.S.G. joint compound resists damage from impact at exterior corners.

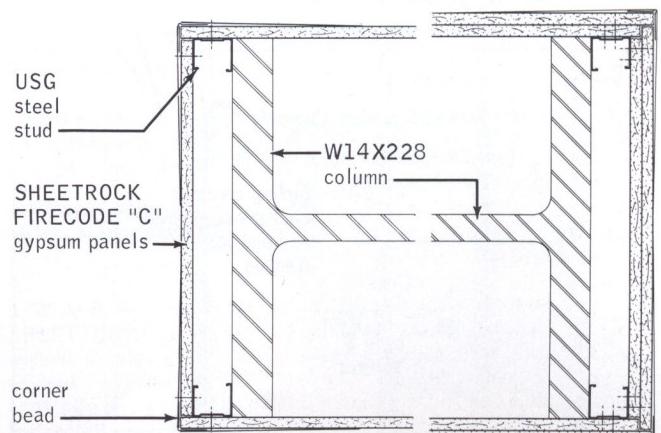
In these assemblies, a hard and abrasion-resistant surface may be obtained with a thin veneer ($\frac{1}{16}$ " to $\frac{3}{32}$ " thick) of specially formulated, high-strength gypsum plaster. IMPERIAL Plaster is applied over IMPERIAL FIRECODE "C" Gypsum Base in lieu of SHEETROCK Panels. (See System Folder SA-912 for other IMPERIAL Plaster Systems.)



2-hr. X518 3-hr. X515
UL Designs



4-hr. X504 3-hr. X514
UL Designs



2-hr. X521 4-hr. X507
UL Designs

exterior wall furring/metal channels

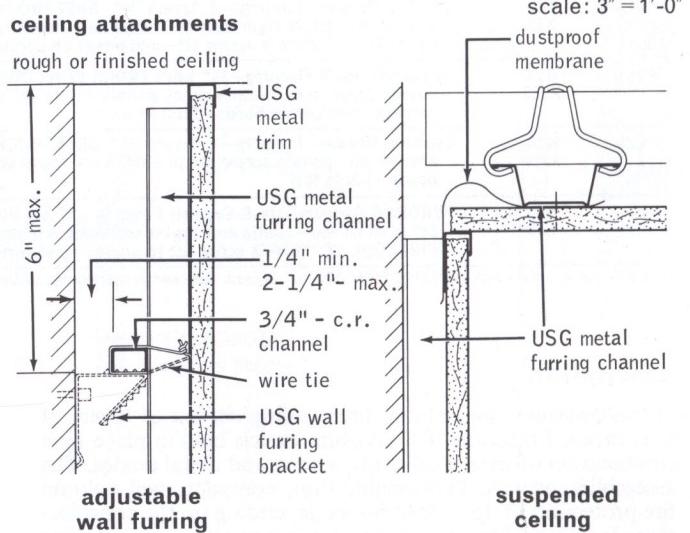
description	comments
USG Metal Furring Channels, 24" o.c., $\frac{1}{2}$ " Foil-Back SHEETROCK panels screw-attached, joints finished	Direct attachment by means of furring strips does not isolate surface membrane from structural stresses. No limiting height
1" THERMAFIBER Z-Furring Insulation—USG Z-Furring Channels appl vert 24" o.c.— $\frac{1}{2}$ " SHEETROCK gypsum panels screw-attached to channels—joints finished	Noncombustible system with mineral fiber insulation

with USG Metal Furring Channels

Exterior masonry walls of virtually any type—brick, tile, PYROBAR Gypsum Tile, monolithic concrete—are readily furred with SHEETROCK Gypsum Panels screw-attached to USG Metal Furring Channels. Channels are either fastened directly to the masonry or furred using USG Adjustable Wall Furring Brackets and horizontal $\frac{3}{4}$ " channels. The latter construction provides up to 3" additional space for pipes, conduits or ducts.

SHEETROCK for this assembly is available $\frac{1}{2}$ " and $\frac{5}{8}$ " thick and in either regular or foil-back types. With Foil-Back SHEETROCK Panels, the system provides significant insulating value (see table) and is effective as a vapor barrier. Meets ASTM requirements for vapor permeability not exceeding 0.30 perms.

SHEETROCK Gypsum Panels also provide an easily decorated facing when directly applied to interior masonry walls. See Gypsum Panels Product Folder SA-927 in this series for application methods and specifications.

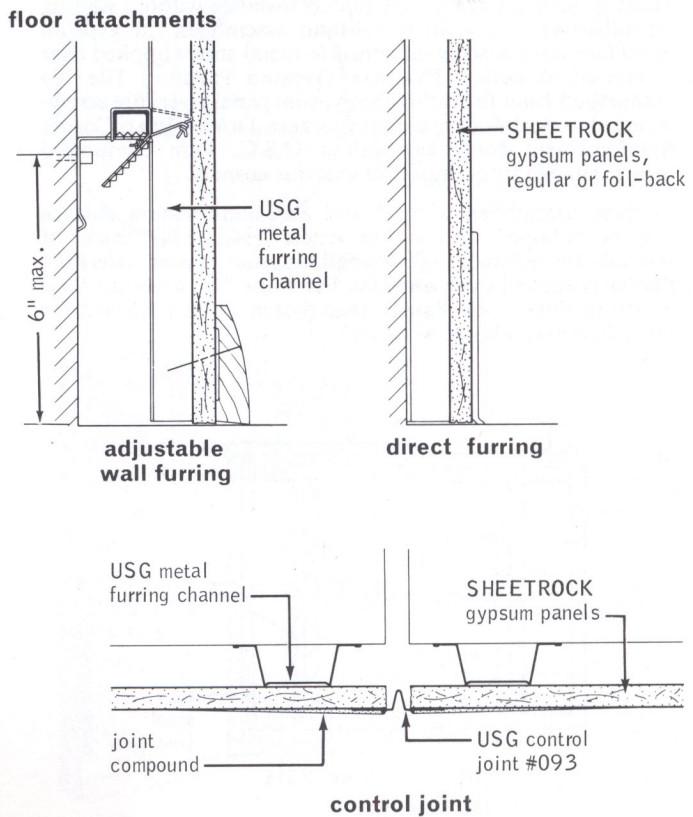
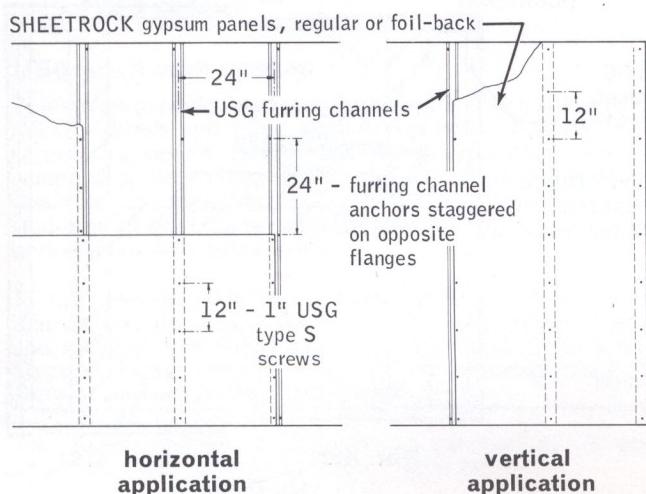


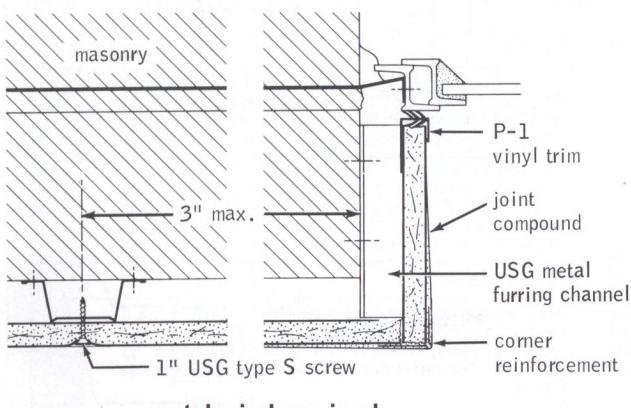
thermal resistance (R) values Foil-Back SHEETROCK panels (1)

$\frac{1}{2}$ " thickness	3.93
$\frac{5}{8}$ " thickness	4.04

(1) Resistances are based on vertical application, inside still air film, panel thickness with one reflective surface facing a $\frac{3}{4}$ " min. still air space.

wall elevation—scale: $\frac{1}{4}$ " = 1'-0"



furred wall plan sections**with USG Z-Furring Channels**

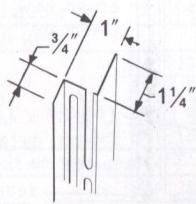
In this assembly, USG Z-Furring Channels, spaced 24" o.c., are used to mechanically attach THERMAFIBER Z-Furring Blankets to exterior walls. The insulation panels are applied progressively as the Z-Furring Channels are attached to the wall. Gypsum panels are screw-attached to the channel flanges to provide a drywall surface isolated to a great degree from the masonry wall. In new construction and in remodeling, this system provides a highly insulative self-furring solid backup for SHEETROCK Gypsum Panels.

USG Z-Furring Channels, suitable for $\frac{3}{4}$ " or 1" thick insulation, are formed from hot-dipped galvanized steel for added corrosion resistance. Fire-resistant THERMAFIBER Z-Furring Blankets provide a noncombustible assembly and offer low heat transmission. Blankets are a semi-rigid spun mineral fiber mat, 1" thick, that meet the requirements for Class A construction. Thermal insulation values (U-factors) for various assemblies are shown below.

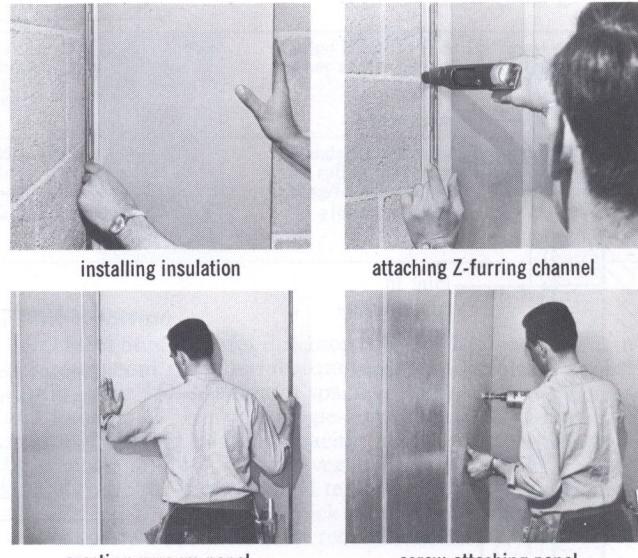
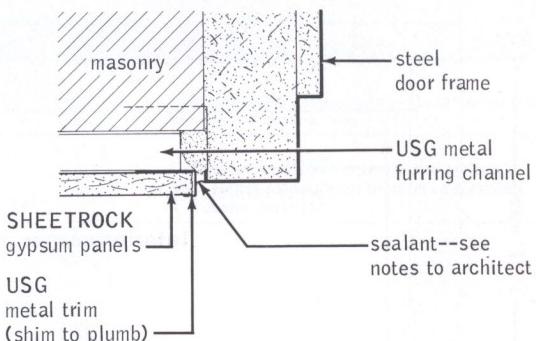
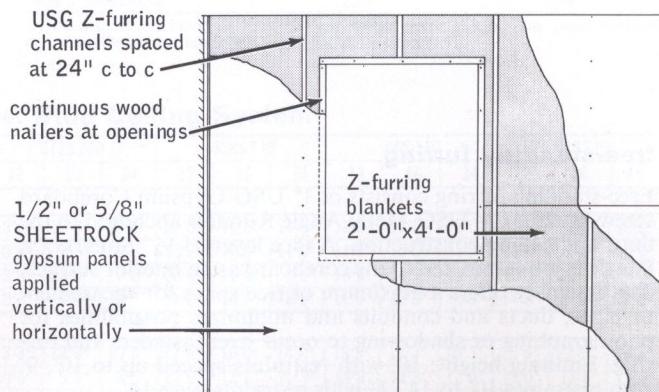
design heat transmission coefficients (U-factors)

wall construction	nom. wall thickn.	unfin. wall	furred wall† (no insul.)	wall insulated with 1" THERMAFIBER Z-Furring Blankets
4" face brick 8" block	12"	.42	.26	.14
4" face brick 4" com. brick	8"	.48	.28	.15
poured conc. 140 lb./cu. ft.	8"	.69	.34	.16
conc. block sand & gravel aggregate	8" 12"	.51 .41	.29 .28	.15 .15

†Interior wall finish: $\frac{1}{2}$ " SHEETROCK Gypsum Panels. All U-factors expressed in BTU/sq. ft./hr./°F, 75°F mean insulating temperature. Values based on 1965-6 ASHRAE Guide and winter conditions (15 mph wind).

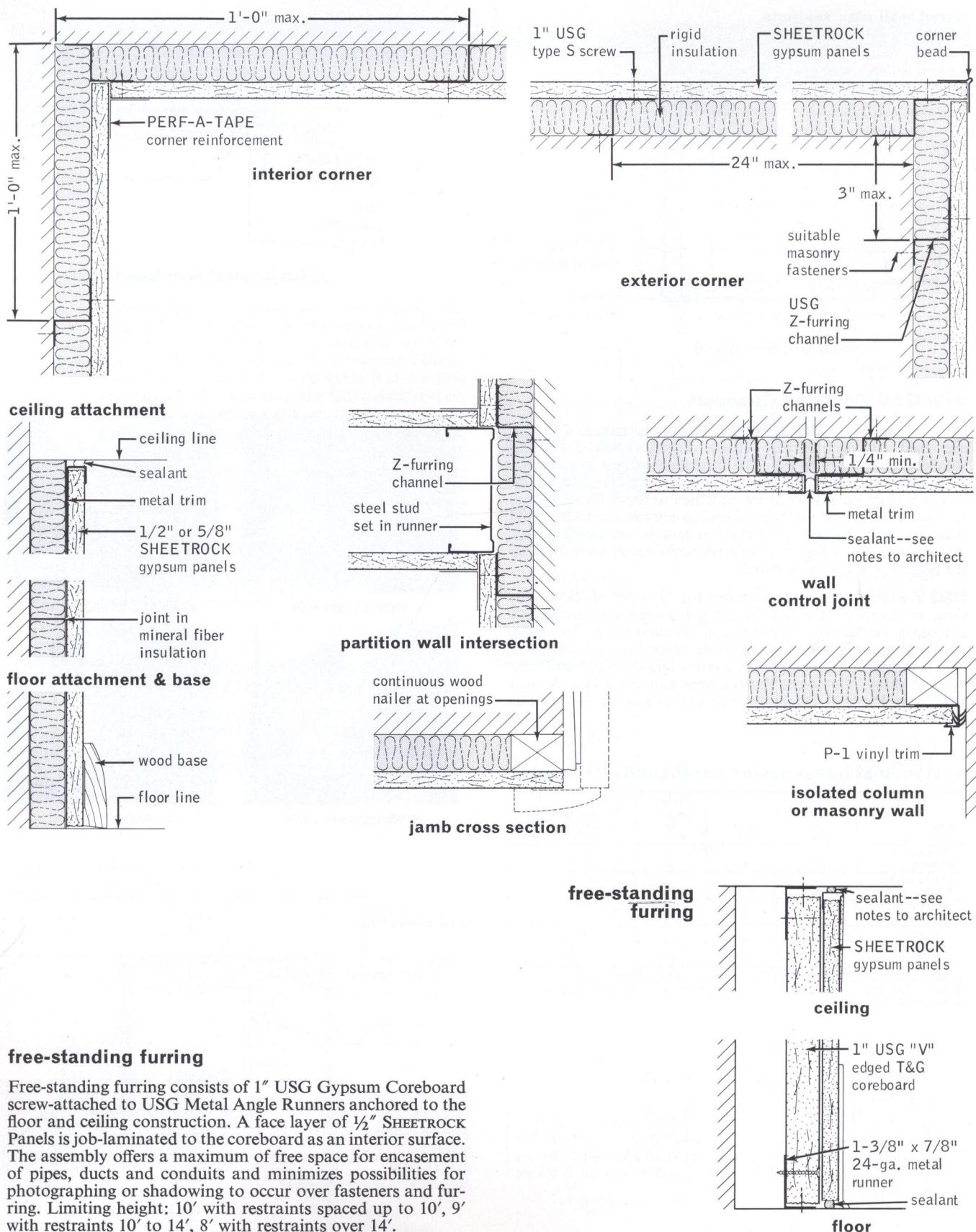


see "gypsum panels" product catalog for full description on accessories & sizes

USG Metal-Framed Drywall Systems**wall elevation**

exterior wall furring/Z-furring channels

scale: 3" = 1'-0"



free-standing furring

Free-standing furring consists of 1" USG Gypsum Coreboard screw-attached to USG Metal Angle Runners anchored to the floor and ceiling construction. A face layer of $\frac{1}{2}$ " SHEETROCK Panels is job-laminated to the coreboard as an interior surface. The assembly offers a maximum of free space for encasement of pipes, ducts and conduits and minimizes possibilities for photographing or shadowing to occur over fasteners and furring. Limiting height: 10' with restraints spaced up to 10', 9' with restraints 10' to 14', 8' with restraints over 14'.

ceilings/test data

USG Metal-Framed Drywall Systems

9.5/Ud

fire rating	description	test no.	sound rating		comments
			STC	IIC	
N/A	5/8" SHEETROCK FIRECODE gypsum panels—1½" cr chan 4' o.c.—USG met fur chan 24" o.c.—panels screw att 12" o.c.—joints fin clg wt 3	USG-5-FT-G&H (s)	45		"Up and over" attenuation—suspension and ceiling membrane only
2 hrs. (beam 2 hrs.)	½" SHEETROCK FIRECODE "C" gypsum panels—furred or susp—USG met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—2½" conc on riblath or corrug stl deck over bar joist clg wt 3	UL Des G515 (f) (was 221-2 hr)			STC based on furred interrupted ceiling, 1½" sound attenuation blankets extending 4' beyond partition
2 hrs.	½" SHEETROCK FIRECODE "C" gypsum panels—2" USG gypsum fir plank welded to bar joists 48" o.c.—skim-coat MASTICAL underlayment or DURABOND 90 compd over plank joints—(1) ½" vinyl fir tile (2) 66-oz carpet & 40-oz pad—USG met fur chan 24" o.c. wire-tied to joists—panels screw-att 12" o.c.—joints fin subflr wt 13	UL Des G516 (f) (was 266-2 hr)			
(1) BBN-720317 (s) (1) BBN-720316 (s) (2) BBN-720314 (s)	51	32	61		
2 hrs. and 3 hrs.	5/8" SHEETROCK FIRECODE "C" gypsum panels—USG met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c. in field and 8" o.c. at ends—joints fin—pre-stressed conc units with 6" deep stems 48" o.c. clg wt 3	UL Des J502 (f) UL Des J503 (f) UL Des J504 (f)			2-hour rating based on 2" thick concrete slab; 3-hour rating based on 2¾" regular or 2½" lightweight concrete slab
3 hrs. (beam 3 hrs.)	5/8" SHEETROCK FIRECODE "C" gypsum panels—USG met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—3" conc on riblath over bar joist clg wt 3	UL Des G512 (f) (was 82-3 hr)		N/A	

beam applications

2 hrs. (beam only)	Gypsum Drywall Caged Beam Fireprfg—1½" USG stl run chan brackets 24" o.c.—1½" x ½" corner angles att to chan brackets—dbl layer ½" SHEETROCK FIRECODE gypsum panels att with Type S screws—met beads on corners—joints fin—2½" conc deck on fluted stl fir	UL Des N501 (was 254-2 hr) UL Des N502 (was 255-2 hr)	(f) (f)		Design N502 based on 1½" steel runner for corner angles and coped brackets
3 hrs. (beam only)	Gypsum Drywall Caged Beam Fireprfg—1½" USG stl run chan brackets 24" o.c.—1½" x ½" corner angles att to brackets—3 layers ½" SHEETROCK FIRECODE gypsum panels att with Type S screws—1" 20-ga hex mesh on bottom over middle layer—met beads on corners—joints fin—2½" conc deck on fluted stl fir	UL Des N505 (was 214-3 hr)	(f)		Extends drywall use to beam protection. Fire rating for restrained assembly; 2-hour rating for unrestrained assembly

description

These floor/ceilings consist of SHEETROCK FIRECODE Gypsum Panels screw-attached to USG Metal Furring Channels clipped or wire-tied to suspended runner channels or wire-tied to supports. For long spans to accommodate large ducts or pipes in the ceiling space, the USG Steel Stud is used as ceiling furring or in a separate system (see table below).

The USG Steel Stud Framing System is ideal for ceilings over office areas in pitched-roof buildings and in modular buildings where ceiling framing is independent of the floor above; accommodates light troffers, ducting and electrical services.

Gypsum panels for these assemblies are available in ½" and 5/8" thicknesses and in five types (see Specifications, page 16). Foil-Back SHEETROCK Panels offer an effective vapor barrier and increase the overall "U" factor of the roof-ceiling assembly (see table at right). Regular SHEETROCK provides a firm base for acoustical tile adhesively applied. USG Exterior Gypsum Ceiling Board is suitable for exterior ceilings and soffits with indirect exposure to the weather.

limitations

USG Steel Studs are not designed to carry live loads, mechanical equipment or material storage (see load table below and details, page 15). Maximum spacing: main support members and hangers 48" o.c. For single-layer panels, maximum steel stud and furring channel spacing is 24" o.c. for horizontal application and 16" o.c. for vertical application. For panels used as base for spray-applied texture finish, maximum frame spacing is 16" o.c. for ½" thick panels horizontally applied; vertical panel application not recommended.

thermal resistance (R) values
Foil-Back SHEETROCK panels (1)

thickness	½"	5/8"
summer conditions	4.92	5.03
winter conditions	2.73	2.84

(1) Resistances are based on horizontal application, inside still air film, panel thickness and one reflective surface facing a ¼" min. still air space.

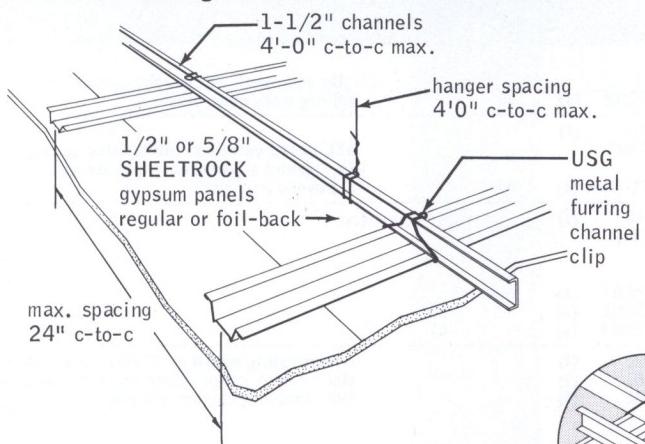
limiting span—USG Steel Stud Ceiling System

stud style	212ST5			358ST5			40ST5			212ST10			358ST10			40ST10			60ST10			
stud spacing-in.	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	
single span																						
uniform load	5	11'0"	10'3"	9'0"	14'6"	13'6"	11'9"	15'3"	14'3"	12'6"	13'0"	12'0"	10'6"	17'3"	16'0"	14'0"	18'6"	17'0"	15'0"	23'6"	21'9"	19'0"
—psf	10	8'9"	8'3"	6'0"	11'6"	10'9"	8'9"	12'3"	11'3"	9'3"	10'6"	9'6"	8'6"	13'9"	12'6"	11'0"	14'9"	13'6"	11'9"	18'9"	17'3"	15'0"
	15	7'9"	6'9"	5'6"	10'0"	8'9"	7'3"	10'9"	9'3"	7'9"	9'0"	8'6"	7'3"	12'0"	11'0"	9'9"	13'0"	11'9"	10'3"	16'3"	15'0"	13'0"
	20	6'9"	5'9"		8'9"	7'6"	6'3"	9'3"	8'0"	6'6"	8'3"	7'6"	6'9"	11'0"	10'0"	8'9"	11'9"	10'9"	9'6"	14'9"	13'9"	12'0"
double and triple span																						
uniform load	5	11'3"	10'6"	9'3"	14'9"	13'9"	12'0"	15'9"	14'6"	12'9"	13'3"	12'3"	10'9"	17'6"	16'0"	14'0"	18'9"	17'3"	15'3"	23'9"	22'0"	19'3"
—psf	10	9'0"	8'3"	7'3"	11'9"	10'9"	9'6"	12'6"	11'6"	10'0"	10'6"	9'9"	8'6"	13'9"	12'9"	11'3"	15'0"	13'9"	12'0"	19'0"	17'6"	15'3"
	15	7'9"	7'3"	6'3"	10'3"	9'6"	7'6"	10'9"	10'0"	7'6"	9'3"	8'6"	7'6"	12'0"	11'3"	9'9"	13'0"	12'0"	10'6"	16'6"	15'3"	13'3"
	20	7'0"	6'6"	5'3"	9'3"	8'6"	5'6"	9'9"	8'6"	5'6"	8'3"	7'9"	6'9"	11'0"	10'3"	8'9"	11'9"	11'0"	9'6"	15'0"	13'9"	12'0"

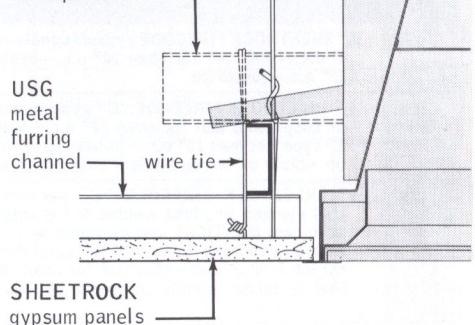
details

scale: 3" = 1'-0"

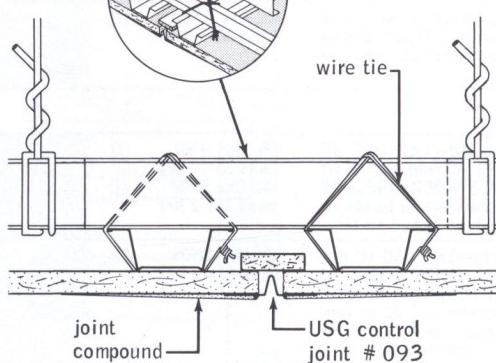
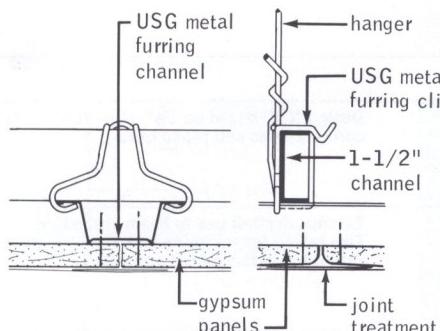
USG metal furring channel



cross reinforcing as required



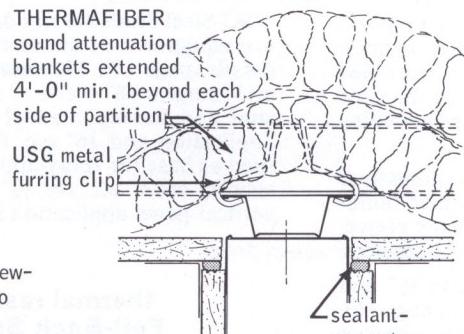
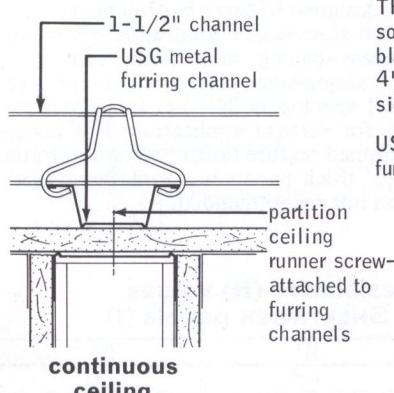
lighting fixture



grillage suspension

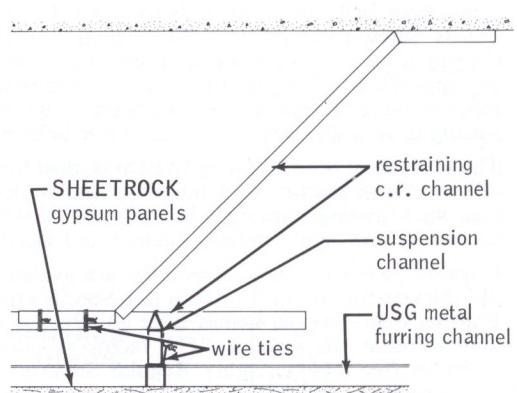
control joint

wall intersection

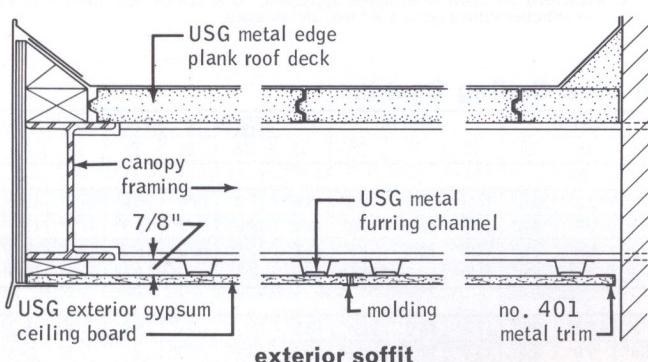


continuous ceiling

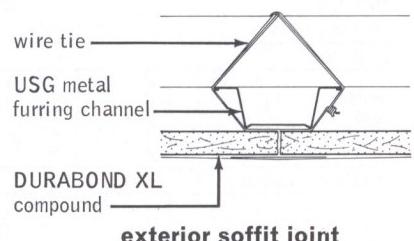
interrupted ceiling



optional bracing for lateral ceiling loads



exterior soffit



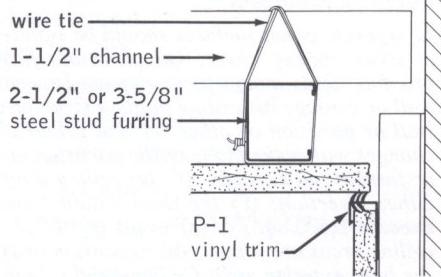
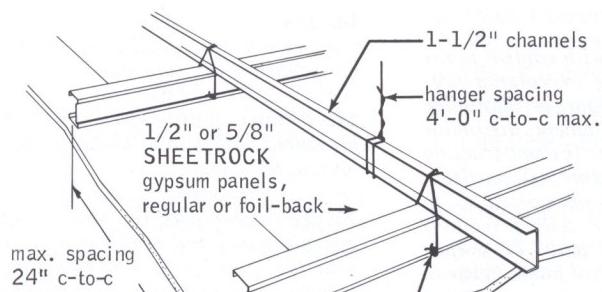
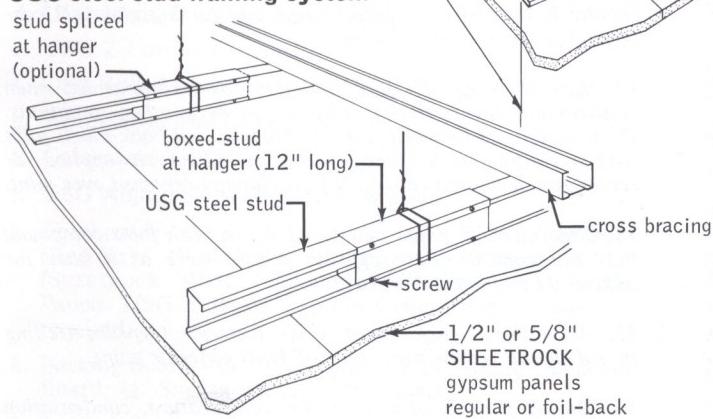
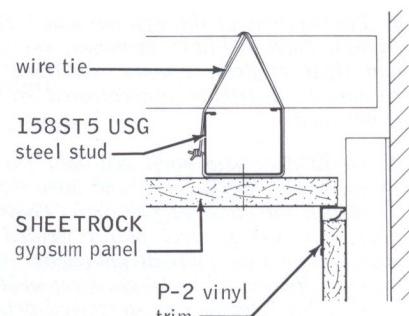
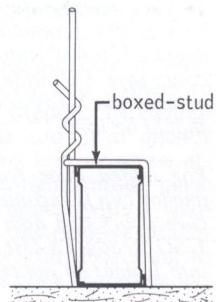
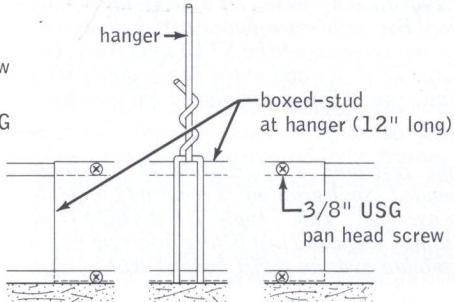
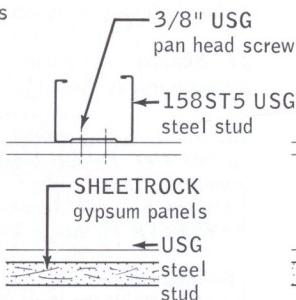
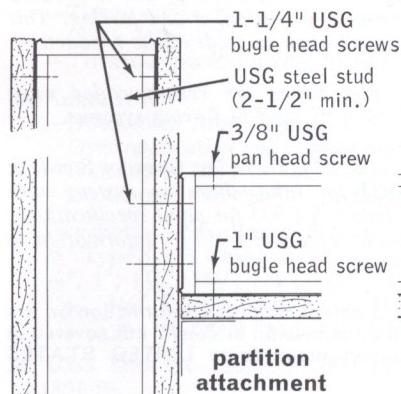
exterior soffit joint

details

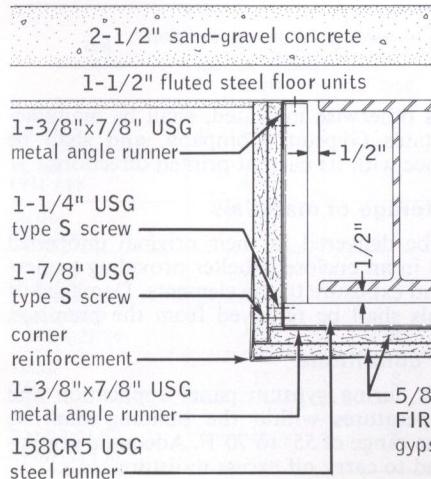
scale: 3" = 1'-0"

USG Metal-Framed Drywall Systems

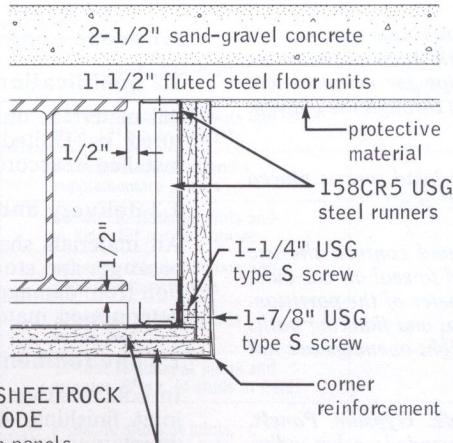
9.5/Ud

USG steel stud furring**USG steel stud framing system****wall intersection****wall intersection (optional)****beam protection (beam only)**

2-hr. UL design no. N501

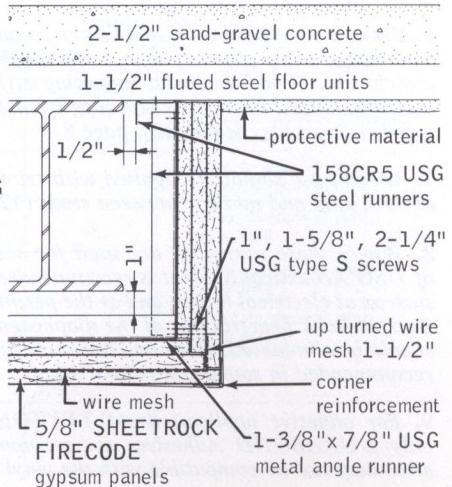


2-hr. UL design no. N502



3-hr. UL design no. N505 (restrained)

2-hr. UL design no. N505 (unrestrained)



specifications

notes to architect

1. Gypsum panel surfaces should be isolated with control joints or other means where: (a) partition, furring or column fire-proofing abuts a structural element (except floor) or dissimilar wall or ceiling; (b) ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration; (c) construction changes within the plane of the partition or ceiling; (d) partition or furring run exceeds 30'; (e) ceiling dimensions exceed 50' in either direction; (f) the area within separate ceiling sections exceeds 2,500 sq. ft.; (g) wings of "L", "U" and "T"-shaped ceiling areas are joined; (h) expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.
2. Penetrations of the gypsum panel diaphragm, such as door frames, borrowed-light openings, vents, grilles, access panels and light troffers, require additional reinforcement at the corners to distribute concentrated stresses if a control joint is not used.
3. Metal door and borrowed-light frames should be at least 18-ga. steel, shop primed, and have throats accurately formed to overall thickness of partition. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchor clips should be 18-ga. steel welded in jamb (see details, page 6). Stud reinforcing described below is screw-attached to jamb anchor clips. Three-piece frames may also be used with these partitions.
- For hollow-core doors up to 2'8" wide, ST5 steel studs may be used for reinforcing. For solid-core doors and hollow-core doors 2'8" to 4'0" wide, reinforcing should be ST10 steel studs. For doors over 4'0" wide, double doors and extra heavy doors such as used for X-ray rooms, two ST10 studs placed back-to-back should be used.
- For added door frame restraint, spot-grouting at the jamb anchor clip is recommended. Spot-grouting is required for solid-core doors and doors over 2'8" wide. Apply DURABOND or USG Ready-To-Use Joint Compound just before inserting board into frame; do not terminate gypsum panel against trim return.
4. Additional chases can be provided in steel studs (except in fire-rated construction) by cutting round holes up to 3/4 of stud width, spaced 12" apart.
5. Ceramic Tile—SHEETROCK W/R Gypsum Panels are recommended as a base on walls for adhesive application of ceramic, metal and plastic tile.
6. Fixture Attachment—Lightweight fixtures and trim should be installed using plastic plugs or expandable anchors for screw attachment. Wood or metal mounting strips for cabinets and shelving should be attached with toggle bolts through the gypsum panels near studs (see details, page 8).
7. Wood base should be applied with trim head screws placed at each stud and midway between studs (12" o.c.).
8. Where these partitions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the partition. Back-to-back penetrations of the diaphragm and flanking paths should be eliminated. Door and borrowed-light openings are not recommended in sound control partitions.
9. For adhesive applications of TEXTONE Gypsum Panels, only DURABOND Adhesives are recommended; other adhesives may not be compatible with the vinyl surface.
10. In ceilings, spacing of hangers and channels is designed to support only the dead load. Heavy concentrated loads should be independently supported.
11. Plenum or attic space closed by ceiling installation should be vented with a min. 1/2-sq. in. net free vent area per sq. ft. of horizontal surface.
12. To comply with UL Floor-Ceiling Designs G512 and G515, gypsum panel end joints should be aligned and backed by 2" wide face panel strips laid over the joints. Face panels should be fastened to continuous furring channels centered 2" either side of joints. For UL Designs J502, J503, and J504, end joints should be backed by 3" wide strips and furring channels centered 3 1/4" either side of joints.
13. Back-blocking of ceiling end joints is recommended when construction occurs during adverse job or weather conditions. Float end joints between furring channels and back-block joint with a continuous 8" face panel strip adhesively applied, or screw-attach floated ends to a 5-ft. channel centered over joint.
14. Treatment of joints and screw heads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.
15. All exposed surfaces of USG Exterior Gypsum Ceiling Board should receive two coats of USG exterior paint.
16. During periods of low outside temperature, condensation may form on exterior walls, collecting airborne dirt to produce photographing or shadowing over fasteners and furring. This natural phenomenon occurs through no fault of the products.
17. Shallow electrical outlet boxes are recommended when insulation less than 1 1/2" thick is used in furring systems.
18. See U.S.G. product folders in this series: Gypsum Panels & Accessories Folder SA-927 for information on system components; Paint Products Folder SA-933 for paint specifications; Plasters, Bases & Accessories Folder SA-917 for information on PYROBAR Partition Tile.

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

- a. USG Steel Studs—158ST5 (1 $\frac{5}{8}$ "), 20ST5 (2"), 212ST5 (2 $\frac{1}{2}$ "), 30ST5 (3"), 358ST5 (3 $\frac{5}{8}$ "), 40ST5 (4"), 60ST5 (6"), 20ST10 (2"), 212ST10 (2 $\frac{1}{2}$ "), 30ST10 (3"), 358ST10 (3 $\frac{5}{8}$ "), 40ST10 (4"), 60ST10 (6").
- b. USG Steel Runner—158CR5 (1 $\frac{5}{8}$ "), 20CR5 (2"), 212CR5 (2 $\frac{1}{2}$ "), 30CR5 (3"), 358CR5 (3 $\frac{5}{8}$ "), 40CR5 (4"), 60CR5 (6"), 20CR10 (2"), 212CR10 (2 $\frac{1}{2}$ "), 30CR10 (3"), 358CR10 (3 $\frac{5}{8}$ "), 40CR10 (4"), 60CR10 (6").
- c. USG Metal Furring Channel.
- d. USG Metal Furring Channel Clip.
- e. USG Z-Furring Channel.
- f. Cold-Rolled Channels (3/4") (1 $\frac{1}{2}$ ”).
- g. 8-ga. Galvanized Hanger Wire.
- h. Galvanized Tie Wire (16) (18)-ga.
- i. USG Adjustable Wall Furring Bracket.
- j. Faceboards—(1/2") (5/8") thick, 48" wide SHEETROCK (Regular) (Foil-Back) (FIRECODE) (FIRECODE "C") (SHEETROCK W/R FIRECODE "C") (TEXTONE) Gypsum Panels, USG Exterior Gypsum Ceiling Board, lengths as required.
- k. Backing Board—1/2" USG Mineral Fiber Sound Deadening Board; 1/4" SHEETROCK Gypsum Panels.
- l. Insulation
 - THERMAFIBER Sound Attenuation Blankets (1") (1 $\frac{1}{2}$ ") (2") x 24" x 48".
 - THERMAFIBER Z-Furring Blankets, 1"x24"x48".
- m. Adhesive
 - DURABOND Joint Compound-Taping or 90 (for double-layer application and column fireproofing).
 - DURABOND 200 (for single-layer application).
 - DURABOND (500) (200) (for furring application).
- n. Fasteners—USG Brand Screws: 3/8" Type S, pan head; 3/8" Type S, hex washer head; 3/8", 1/2" Type S-12, pan head; 7/8", 1", 1 $\frac{1}{4}$ ", 1 $\frac{5}{16}$ ", 1 $\frac{1}{8}$ ", 1 $\frac{1}{4}$ ", 2 $\frac{1}{4}$ " Type S, bugle head; 1 $\frac{5}{8}$ ", 2 $\frac{1}{4}$ " Type S, trim head; 1 $\frac{1}{2}$ " Type G, bugle head; 1 $\frac{1}{4}$ " Type W, bugle head; 1 $\frac{1}{4}$ " GWB-54 annular ring nail.
- o. USG Trim No. (200-A) (200-C) (401) (402) (P-1) (801-A) (801-B).

- p. USG Corner Bead—(No. 103 DUR-A-BEAD) (No. 800) Metal Corner Reinforcement.
- q. USG Control Joint No. 093.
- r. Joint Treatment—(select a U.S.G. Joint System).
- s. Caulking—USG Acoustical Sealant.
- t. PYROBAR Gypsum Partition Tile—3" Hollow.
- u. RED TOP Partition Tile Cement.
- v. Clean, sharp sand complying with ASTM C35 (not available from U.S.G.).
- w. USG 1 $\frac{3}{8}$ " x 7/8" x 24-ga. Galvanized Metal Angles.
- x. 2" x 26-ga. galv. steel straps (not available from U.S.G.).

Part 3: execution

3.1 partition installation

3.1.1 stud system erection

Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2" from each end and spaced 24" o.c., or to suspended ceilings with toggle or molly bolts spaced 16" o.c.

Position studs vertically, engaging floor and ceiling runners, and spaced 24" o.c. When necessary, splice studs with 8" nested lap and one positive attachment per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are installed directly against exterior walls and a possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.

Anchor all studs for shelf-walls and those adjacent to door and window frames, partition intersections, and corners to ceiling and floor runner flanges with USG Metal Lock Fastener tool. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bolt or screw attachment. Over metal door and borrowed-light frames, place horizontally a cut-to-length section of runner, with a web-flange bend at each end, and secure with one positive attachment per flange. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over door frame header.

3.2.1 gypsum panel erection

Apply gypsum panels (vertically) (horizontally). Position all edges over studs for vertical application; all ends over studs

screw locations and spacing—fire-rated steel stud drywall partitions

test number	face layer application				base layer application			
	USG brand screw		spacing and location	USG brand screw		spacing and location		
	length	type		length	type			
U of C 6/15/65	1 $\frac{5}{8}$ "	S	12" o.c. to studs at joints and in field, 12" o.c. to runners	1"	S	12" o.c. to studs at joints and in field, 12" o.c. to runners		
UL Des U411-2 hr.	1 $\frac{1}{2}$ "	G	adhesive lamination and supplementary screws	1"	S	8" o.c. to studs at joints, 12" o.c. to studs in field		
UL Des U411-2 hr.	1 $\frac{5}{8}$ "	S	16" o.c. to studs at joints and in field, 12" o.c. to runners	1"	S	16" o.c. to studs at joints and in field		
UL Des U412-2 hr.	1 $\frac{1}{2}$ "	G	adhesive strip lamination and supplementary screws	1"	S	12" o.c. to studs at joints and in field		
UL Des U412 U of C 9/21/64	1 $\frac{5}{8}$ "	S	12" o.c. to studs at joints and in field	1"	S	12" o.c. to studs at joints and in field		
T-3362 OSU	1"	S	12" o.c. to studs at joints and runners, 8" o.c. to studs in field					
T-1174 OSU U of C 7/31/62 GA-WP-45 1 hr.	1"	S	8" o.c. to studs at joints, 12" o.c. to studs in field					

for horizontal application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.

Screw spacing shown below is for non-rated construction. For fire-rated construction, obtain screw spacing from table, page 17.

For single-layer vertical application of gypsum panels, space screws 12" o.c. in field of panels and 8" o.c. staggered along vertical abutting edges. For horizontal panel application, space screws 12" o.c. in field and along abutting end joints.

For single-layer adhesive application, pre-bow panels and attach vertically to studs using $\frac{3}{8}$ " continuous adhesive beads applied to face of studs. Apply one bead to intermediate studs and two beads to studs occurring at panel joints. Secure panel at top and bottom with 1" type S screws spaced 16" o.c. Impact panel along each stud to insure good contact at all points.

For double-layer screw attachment, space screws 16" o.c. for both layers. Apply both layers of gypsum panels vertically with joints in face layer offset from base layer joints. For $\frac{5}{8}$ " panels, use 1" screws for base layer and $1\frac{1}{8}$ " screws for face layer. For $\frac{1}{2}$ " panels, use $\frac{7}{8}$ " screws for base layer and $1\frac{5}{16}$ " screws for face layer.

For double-layer laminated construction, attach base layer with 1" type S screws spaced 8" o.c. at joint edges and 12" o.c. in field. Apply face layer vertically with DURABOND Joint Compound-Taping spread on back side, joints staggered approx. 12" and fastened to base layer with $1\frac{1}{2}$ " type G screws. Drive screws approx. 2' from ends and 4' o.c. in field of panel, 1' from ends and 3' o.c. along a line 2" from vertical edges. Temporary shoring or support installed 16" to 24" o.c. until adhesive is dry may be used in place of screws.

3.1.3 mineral fiber sound deadening board erection

For two-layer construction with mineral fiber sound deadening board, apply base layer sound deadening board vertically with joints staggered on opposite sides of partition. Attach board to steel studs with 1" type S screws spaced 27" o.c. along vertical joints and at quarter and mid-points of panel height along intermediate stud. Place two screws at each end of board through runner 1" from each vertical edge. Apply face layer vertically with joints staggered from base layer joints and laminate to base layer using DURABOND Joint Compound-Taping. Fasten face panels around perimeter with $1\frac{1}{8}$ " type S screws spaced 12" o.c.

3.2 chase wall erection

Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stub nails or power-driven anchors 24" o.c., to suspended ceilings with toggle or molly bolts 16" o.c., or to wood framing with suitable fasteners 24" o.c.

Position steel studs vertically in runners, 24" o.c. with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Anchor all studs to floor and ceiling runner flanges with USG Metal Lock Fastener tool.

Cut cross bracing to be placed between rows of studs from gypsum panels, 12" high by chase wall width. Space braces 48" o.c. vertically and attach to stud webs with six 1" type S screws per brace. If larger braces are used, space screws 8" o.c. max. on each side.

Bracing of $2\frac{1}{2}$ " steel studs may be used in place of gypsum panels. Anchor web at each end of steel brace to stud web with two $\frac{3}{8}$ " pan head screws. When chase wall studs are not opposite, install steel stud cross braces 24" o.c. horizontally and securely anchor each end to a continuous horizontal $2\frac{1}{2}$ " runner screw-attached to chase wall studs within the cavity.

3.3 drywall soffit erection

Attach steel runners 24" o.c. to concrete slabs with concrete stub nails or power-driven anchors, to suspended ceilings with toggle bolts or molly bolts or to wood framing with suitable fasteners. On stud walls, space fasteners to engage each stud. On ceilings, place fastener close to outside face runner. Fasten vertical face panel to web of face corner runner and flange of ceiling runner with 1" type S screws spaced 12" o.c. For braced furring, insert steel studs between face corner runner and sidewall runner and attach alternate studs to runners with USG Metal Lock Fastener tool. Attach bottom face panel to steel studs and runners with 1" type S screws spaced 12" o.c. Space screws in face corner runner at least 1" from edge of gypsum panel.

3.4 ceiling installation

3.4.1 grillage erection

Space 8-ga. hanger wires 48" o.c. along carrying channels and within 6" of ends of carrying-channel runs. In concrete, anchor hangers by attachment to reinforcing steel, by loops embedded at least 2" or by approved inserts. For steel construction, wrap hanger around or through beams or joists.

Install $1\frac{1}{2}$ " carrying channels 48" o.c., and within 6" of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel. Provide 1" clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12" and secure each end with double-strand 16-ga. tie wire.

Erect metal furring channels at right angles to $1\frac{1}{2}$ " carrying channels or main support members. Space furring (16") (24") o.c. and within 6" of walls. Provide 1" clearance between furring ends and abutting walls and partitions. Secure furring to carrying channels with clips or saddle-tie to supports with double-strand 16-ga. tie wire. At splices, nest furring channels at least 8" and securely wire-tie each end with double-strand 16-ga. tie wire.

At light troffers or any openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore lateral stability of grillage.

3.4.2. steel stud framing system erection

Attach runners at ceiling height, through gypsum panels, to each partition stud with two screws. Insert steel studs in runners and attach each end with one $\frac{3}{8}$ " pan head screw. Install $1\frac{1}{8}$ " stud cross-bracing over stud framing, space 48" o.c. and attach to each framing stud with two $\frac{3}{8}$ " pan head screws. At hangers, install 12" long stud section for box reinforcing or lap studs 12" and secure each end with two $\frac{3}{8}$ " pan head screws.

At light troffers or any openings that interrupt the ceiling, install additional cross reinforcing to maintain structural integrity of framing.

3.4.3 gypsum panel erection

Apply gypsum panels of maximum practical length with long dimension at right angles to furring channels. Position end joints over channel web and stagger in adjacent rows.

Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" type S screws spaced 12" o.c. in field of panels and along abutting ends and edges.

3.5 caged beam fireproofing

Position ceiling runners at least $\frac{1}{2}$ " from and parallel to beam and fasten to floor units with $\frac{1}{2}$ " type S-12 pan head screws spaced 12" o.c. Fabricate hanger brackets from $1\frac{1}{8}$ " steel runners allowing ($\frac{1}{2}$ ") (1") clearance at bottom of beam. Space brackets 24" o.c. along beam and attach to ceiling

runners with $\frac{1}{2}$ " type S-12 screws. Install lower corner runners parallel to beam and fasten to brackets with $\frac{1}{2}$ " type S-12 screws.

Screw-attach (two) (three) layers of $\frac{5}{8}$ " SHEETROCK FIRECODE Gypsum Panels to channel brackets installing vertical panels first, with bottom panels overlapping lower edges of vertical panels in each layer. Attach panels to channel brackets with (1") (1 $\frac{1}{4}$) type S screws 16" o.c. for base layer, 1 $\frac{5}{8}$ " type S screws 12" o.c. for middle layer and (1 $\frac{5}{8}$) (2 $\frac{1}{4}$) type S screws 8" o.c. for face layer. For 3-hour assembly, install wire mesh over bottom middle layer panel, extend 1 $\frac{1}{2}$ " up each side and fasten with 1 $\frac{5}{8}$ " screws used to fasten panels.

3.6 column fireproofing installation

3.6.1 UL Design X518-2 hrs.

Attach inner layer $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels to 1 $\frac{5}{8}$ " steel studs with 1" type S screws spaced 24" o.c. and place assembly with gypsum panel next to column flange. Install gypsum panel layer vertically around column using 1" type S screws to attach base layer to stud web 24" o.c. and face layer to stud flange 12" o.c. Apply face layer vertically over web face side of column and fasten through base layer to web of studs with 1 $\frac{5}{16}$ " type S screws spaced 12" o.c. and staggered from screws in base layer. Apply corner bead at all corners, fasten with 1" type S screws 12" o.c. and finish with joint compound.

3.6.2 UL Designs X521-2 hrs. & X514-3 hrs.

For all W14 x 228 steel columns, provide fire protection with $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels applied vertically over 1 $\frac{5}{8}$ " steel studs positioned at corners. Attach panels to studs with 1" type S screws spaced 12" o.c. For 3-hour rating install additional layer over web surface and attach to studs with 1 $\frac{5}{8}$ " type S screws spaced 12" o.c. Apply corner bead at all corners and finish with joint compound.

3.6.3 UL Design X515-3 hrs.

Attach inner layer $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels to 1 $\frac{5}{8}$ " steel studs with 1" type S screws spaced 12" o.c. and place assembly with gypsum panel next to column flange. Install two additional layers to stud flange and three additional layers to stud web over web face side of column. Fasten base layers with 1" type S screws, middle layers with 1 $\frac{5}{8}$ " screws and face layers with 2 $\frac{1}{4}$ " screws. Space all screws 12" o.c. vertically. Apply corner bead at corners; finish with joint compound.

3.6.4 UL Design X507-4 hrs.

For all W14 x 228 steel columns, provide fire protection with double-layer $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels applied vertically over 1 $\frac{5}{8}$ " steel studs positioned at corners. Attach base layer to studs with 1" type S screws spaced 12" o.c. and attach face layer with 1 $\frac{5}{8}$ " type S screws spaced 12" o.c. and staggered 6" from base layer screws. Apply corner bead at all corners and finish with joint compound.

3.6.5 UL Design X504-4 hrs.

a. **Mortar**—Mix mortar in proportion of 1 part Partition Tile Cement to 3 parts sand, by weight. Mortar shall not be retempered.

b. **Gypsum Tile**—Lay tile plumb and true around columns as shown on plans after rough plumbing and wiring are in place. Place tile with core holes horizontal in uniformly level courses on $\frac{1}{2}$ " thick mortar beds. Set tile to provide $\frac{1}{2}$ " minimum clearance from edges and faces of column. Stagger vertical joints; interlock tile at corners; cut all joints flush. Use no

broken tile; fill chinks and crevices with mortar. Cut top tile obliquely and wedge in place at ceiling; slush joint full with mortar. Seal exposed core holes with at least 2" of mortar. Do not cut or chase tile for conduit or other piping.

c. **Gypsum Panels**—Install 2"x26-ga. galvanized perimeter straps horizontally around tile no more than 24" from floor and ceiling and max. 48" o.c. Secure strap ends with $\frac{3}{8}$ " USG type S pan head screws. Place 1 $\frac{3}{8}$ "x $\frac{1}{8}$ "x24-ga. galvanized metal angles, cut to $\frac{1}{2}$ " less than floor-to-ceiling height, over perimeter straps at each corner. Secure corners to straps with $\frac{3}{8}$ " type S pan head screws driven in each angle flange. Install $\frac{5}{8}$ " SHEETROCK FIRECODE "C" Gypsum Panels vertically and securely attach to corner angles with 1" type S screws spaced 8" o.c. Apply corner bead at all corners and finish with joint compound.

3.6.6 UL Design X524-2 hrs.

Provide fire protection to all columns with three layers $\frac{1}{2}$ " SHEETROCK FIRECODE "C" Gypsum Panels screw-attached to 1 $\frac{5}{8}$ " steel studs positioned at column corners. Cut studs $\frac{1}{2}$ " to $\frac{3}{4}$ " less than column height. For columns having depth of 36" or less, apply panels vertically and stagger joints between layers at least 30".

When column depth exceeds 36", install additional 1 $\frac{5}{8}$ " studs in each web recess inside and along column flanges and at the web center. Set studs in runners placed horizontally, parallel to web between column flanges and spaced max. 8 ft. o.c. vertically. Fasten studs to runners at top and bottom with $\frac{1}{2}$ " type S-12 pan head screws. Apply gypsum panels horizontally and stagger joints between layers at least 12".

Attach inner layer of gypsum panels to 1 $\frac{5}{8}$ " steel studs with 1" type S screws spaced 12" o.c. and place assembly with gypsum panel next to column flange. Install two additional layers to stud flange and three additional layers to stud web over web face side of column. Fasten inner layers with 1" type S screws, middle layers with 1 $\frac{5}{8}$ " type S screws, and face layers with 2 $\frac{1}{4}$ " type S screws. Space all screws 12" o.c. and stagger in adjacent layers.

3.7 wall furring installation

3.7.1 direct furring channel attachment

Attach metal furring channels (vertically) (horizontally), spaced 24" o.c., to masonry or concrete surfaces with hammer-set or power-driven fasteners or concrete stub nails staggered 24" o.c. on opposite flanges. Nest channels 8" at splices and anchor with two fasteners in each wing. Where furring channel is installed directly to exterior wall and a possibility of water penetration through walls exists, install asphalt felt protection strip between furring channel and wall.

3.7.2 bracketed furring channel attachment

Attach adjustable wall furring brackets with serrated edges up, 36" o.c. horizontally, 48" o.c. vertically, within 4" of columns or other abutting construction, within 6" of floor and ceiling, and as required above and below windows, with (2" cut nail in mortar joints of brick or clay tile or concrete block, or in field of lightweight aggregate blocks) ($\frac{5}{8}$ " concrete stub nails or power-driven nails or other suitable fasteners in monolithic concrete). Place fastener in top hole of bracket.

Lay cold-rolled channels horizontally with flanges down, on furring brackets, plumb with other channels, and tie with double-strand 16-ga. or triple-strand 18-ga. wire; bend down excess bracket length. Erect metal furring channel vertically, spaced 24" o.c. and tie with double-strand 16-ga. or triple-strand 18-ga. wire at each junction with cold-rolled channel.

3.7.3 gypsum panel erection

Apply gypsum panels (vertically) (horizontally). Position all edges over furring channels in vertical application; all ends over framing in horizontal application with joints staggered in successive courses. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" type S screws spaced 12" o.c.

3.7.4 mechanical application—Z-furring channels

Erect rigid mineral-fiber insulation vertically and hold in place with Z-furring channels spaced 24" o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24" o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner; start from this furring channel with a 3" strip of insulation followed by furring channel in the normal manner. At interior corners, space second channel no more than 12" from corner and cut insulation to fit. Hold insulation in place until gypsum panels are installed with 10" long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel.

Apply gypsum panels (vertically) (horizontally) with vertical joints occurring over channels. Attach gypsum panels to channels with 1" type S screws spaced 12" o.c.

3.8 accessory application

- a. **Joint System**—Finish all face panel joints and internal angles with a U.S.G. Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.
- b. **Laminating Adhesive**—Spread to provide $\frac{1}{2}$ " adhesive beads $4\frac{1}{2}$ " o.c. for full sheet lamination. For strip lamination, apply adhesive in vertical strips of four $\frac{1}{2}$ " beads $1\frac{1}{2}$ " to 2" o.c. Space strips 24" o.c.
- c. **Corner Bead**—Reinforce all vertical and horizontal exterior corners with corner bead fastened with $\frac{9}{16}$ " rosin-coated staples 9" o.c. on both flanges along entire length of bead.
- d. **Metal Trim**—Where assembly terminates against masonry or other dissimilar material, apply metal trim over panel edge and fasten with screws or $\frac{9}{16}$ " rosin-coated staples 12" o.c.
- e. **P-1 Vinyl Trim**—Slip trim over panel with long flange behind panel. Install panel with trim firmly abutting surface.
- f. **Screws**—Power-drive at least $\frac{3}{8}$ " from edges or ends of panel to provide uniform dimple $\frac{1}{32}$ " deep.
- g. **Control Joints**—Break panel behind joint and back by double framing members (and 2" wide gypsum panel strip). Attach control joint to face layer with $\frac{9}{16}$ " rosin-coated staples spaced 6" o.c. on both flanges along entire length of joint.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE, PERF-A-TAPE, DURABOND, DUR-A-BEAD, THERMAFIBER, TEXTONE, PYROBAR, RED TOP, IMPERIAL.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

lightweight, quickly-erected, fire-rated walls and ceilings with excellent sound attenuation

These basic gypsum drywall assemblies offer economical, quickly erected, load-bearing partitions and ceilings wherever fire protection is desired with wood framing. Excellent sound attenuation at low cost is provided when gypsum panels are resiliently attached. The assemblies are likewise suitable for wall furring and exterior soffit applications. Also designed for wood-frame construction are USG Area Separation Walls, newly developed firewall assemblies for multi-family housing. Variations of the systems meeting special requirements are outlined below:

Single Layer—a basic drywall load-bearing construction suitable where SHEETROCK Gypsum Panels are applied direct to wood framing—either vertically, with long edges parallel to framing, or horizontally with long edges at right angles to framing members. Horizontal application, recommended except in fire-rated partition construction or for predecorated panels, provides greater strength, reduces joint treatment and blocking needed, compensates for uneven framing alignment. Fastening of panels is by four alternate methods:

1. **Standard single nailing**—6" to 7" c. to c. spacing for ceilings, 7" to 8" for walls.

2. **Double nailing**—for minimizing defects due to loosely nailed panels. First nails spaced 12" o.c., followed by second nails within 2" of first.

3. **Screw application**—best known insurance against fastener pops caused by loosely attached panels. 1 1/4" USG Brand Type W Screw is used.

4. **Adhesive nail-on**—continuous bead of DURABOND 200 or 300 Adhesive applied to framing plus supplementary nailing; improves bond strength by 50% to 100%, greatly reduces face nailing needed. When DURABOND Vinyl Foam Tape is used, supplementary fasteners are unnecessary.

Two other proven methods upgrade job quality:

Back-Blocking Joint Reinforcement—a method designed to minimize an inherent joint deformation ("ridging") that may occur with adverse job and weather conditions.

Floating Interior Angle System—application of panels to effectively reduce nail pops and angle cracking which may result from stresses at intersections of walls and ceilings.

Double Layer—systems consist of a face layer of SHEETROCK Gypsum Panels job-laminated and/or nailed to base layer of gypsum panels and directly attached to wood framing in walls and ceilings. Because these laminated systems minimize the

use of mechanical fasteners in the face layer, finer appearance results—along with greater strength, fire and sound resistance. Adhesive lamination of face layer to base layer, when both are gypsum panels, is by either of two methods: (a) **strip lamination**—DURABOND Joint Compound-Taping or 90 applied in vertical strips 24" o.c. and supplementary 1 1/2" USG Brand Type G Screws, or (b) **sheet lamination**—adhesive applied over the entire panel surface with supplementary Type G screws or temporary supports until adhesive dries.

When a fire rating is not required, contact bonding of face layer with DURABOND Adhesive is preferred. Either DURABOND 500 (notched-spreader applied) or DURABOND 600 (roller-applied) is used with fasteners 16" o.c. at top and bottom of wall panels and perimeter fasteners 48" o.c. on ceilings.

These assemblies are completed with a U.S.G. joint treatment system and decorating—both steps unnecessary in walls, however, when predecorated vinyl-surfaced TEXTONE Gypsum Panels are used.

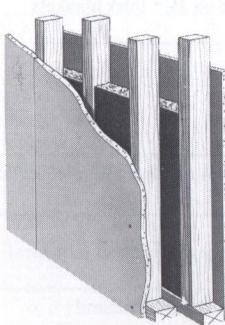
Three alternate framing methods with wood studs spaced 16" o.c. provide load-bearing assemblies developed to meet fire resistance and sound control requirements in partitions:

1. Conventional 2x4 stud construction, two layers 5/8" SHEETROCK FIRECODE Gypsum Panels, or FIRECODE or regular SHEETROCK over base layer of 1/4" SHEETROCK Gypsum Panels. These offer higher sound and/or fire ratings than did the original double wall assembly employing two layers of 3/8" SHEETROCK.

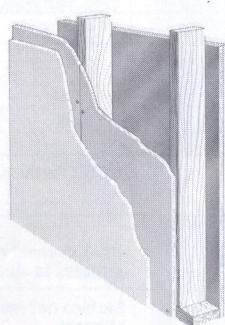
2. Double row of 2x3 staggered studs set on separate plates 1" apart, with single layer of 5/8" SHEETROCK FIRECODE panels and 2" THERMAFIBER Sound Attenuation Blankets in the cavity. This provides sound isolation of 51 STC where one-hour fire resistance (load bearing) is required. With 2x4 staggered studs on a common 2x6 plate and double layer 5/8" SHEETROCK FIRECODE "C" Panels, 2-hour fire resistance is obtained.

3. Double row of 2x4 studs set on separate plates 1" apart, with double layer 5/8" SHEETROCK FIRECODE "C" offers sound isolation of 51 STC, 2-hour fire resistance and chase space required for party walls in garden apartments. With 3 1/2" blankets in one cavity, sound attenuation increases to 56 STC.

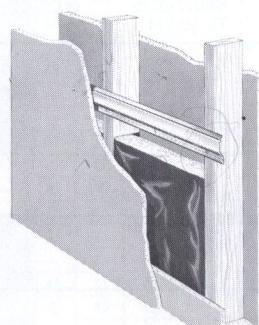
Resilient Attachment—SHEETROCK Gypsum Panels are screw-attached to RC-1 SHEETROCK Resilient Channels, also screw-
(continued on page 3)



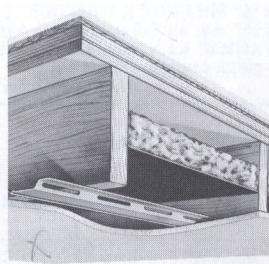
single-layer
staggered stud
partition



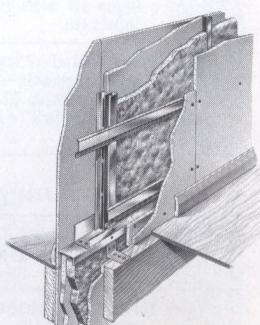
double-layer
partition



single-layer
resilient partition



single-layer
resilient ceiling



cavity-type
separation wall

test data/partitions

partition applications

fire rating	description	test no.	stc rating	comments
			11-f 16-f	
45 min.	Wd Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c.—panels nailed 7" o.c.—1½" cem ctd nails—joints fin wt 6 width 4¾"	UL Des U317 (was 1-45 min)	(f)	
1 hr.	Wd Stud—Resil ½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" or 24" o.c.—3" THERMAFIBER ins blkts—RC-1 chan one side spaced 24" o.c.—panels att with 1" Type S screws—opp side direct att with 1¼" Type W screws—joints fin—perimeter caulked wt 7 width 5¾"	UL Des U311 (was 27-1 hr) USG-33-FT-G&H (s)	(f) 52	Best value of wood stud drywall party walls
1 hr.	Wd Stud—Resil ½" SHEETROCK FIRECODE gypsum panels—2x4 16" o.c.—RC-1 chan both sides spaced horiz 24" o.c. att with 6d nails—panels att with 1" Type S screws—joints fin—perimeter caulked wt 7 width 5¾"	T-1396-OSU TL-60-52	(f) (s) 45	Fully resilient 1-hr. fire rated party wall
1 hr.	Wd Stud—½" SHEETROCK FIRECODE or W/R FIRECODE "C" gypsum panels—2x4 16" or 24" o.c.—panels nailed 7" o.c.—1½" cem ctd nails—joints fin—perim caulked wt 7 width 4¾"	UL Des U305 (was 5-1 hr) UL Des U314 (was 38-1 hr) BBN-700725 USG-30-FT-G&H (s)	(f) (f) 34	UL Des U314 based on 24" stud spacing. BBN test includes 3" insul. blankets. USG-30-FT based on 16" stud spacing
1 hr. est	Stag Wd Stud—½" SHEETROCK FIRECODE gypsum panels—2x3 16" o.c.—2x3 plates 1" apart—panels att with 1¼" Type W screws 16" o.c.—2" THERMAFIBER sound atten blkts one side—perim caulked wt 8 width 7½"	USG-106-FT-G&H (s) USG-155-FT-G&H (s)	51 49	Best value in 50 stc range for this type of party wall. 155-FT based on 2x6 common plate
1 hr. est	Wd Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c.—2 layer—base layer ¼" SHEETROCK gypsum panels appl vert with 4d ctd nails—½" panels face layer strip lamin—joints stag & fin—perimeter caulked wt 8 width 5¾"	USG-221-ST-G&H (s) TL-69-52	(s) 45	221-ST based on ½" lamin. face layers & 1½" THERMAFIBER sound atten. blankets
1 hr. est	Stag Wd Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c. on 2x6 com plate—panels att with 6d ctd nails 7" o.c.—2" THERMAFIBER sound atten blkts one side—perim caulked—joints fin wt 8 width 6¾"	TL-69-213	(s) 45	
1 hr.	Wd Stud—2 layers ¾" SHEETROCK gypsum panels lamin & nailed—2x4 16" o.c.—joints fin wt 7 width 5¾"	T-118-48-OSU TL-57-14	(f) (s) 38	
1 hr. est	Wd Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2x4 16" o.c.—3" THERMAFIBER ins blkts—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—joints fin wt 12 width 6¾"	TL-67-239 TL-67-212	(s) (s) 59 49	Exceptional sound control for party walls. TL-67-212 based on same construction without blankets
2 hrs.	Wd Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2x4 16" o.c.—2" THERMAFIBER sound atten blkts—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—joints fin wt 13 width 6¾"	T-4799-OSU	(f)	
2 hrs.	Wd Stud—2 layers ¾" SHEETROCK FIRECODE or W/R FIRECODE "C" gypsum panels—2x4 16" o.c.—base layer 6d nails 6" o.c.—face layer lamin or nailed to base—joints fin wt 12 width 6¾"	UL Des U301 (was 4-2 hr)	(f) N/A	Basic 2-hour partition construction
2 hrs. est	Wd Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels—2 rows 2x4 16" o.c. on sep plates 1" apart—base layer att with 6d ctd nails 16" o.c.—face layer att with 7d ctd nails 7" o.c.—perim caulked—joints fin wt 13 width 10¾"	USG-710120 TL-69-214	(s) (s) 56 51	USG-710120 based on 3½" thick blankets in one cavity
2 hrs. est	Stag Wd Stud—2 layers ¾" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c. on 2x6 com plate—base layer att with 6d ctd nails 6" o.c.—face layer att with 8d ctd nails 8" o.c.—perim caulked—joints fin wt 13 width 8¾"	TL-69-211	(s) 47	

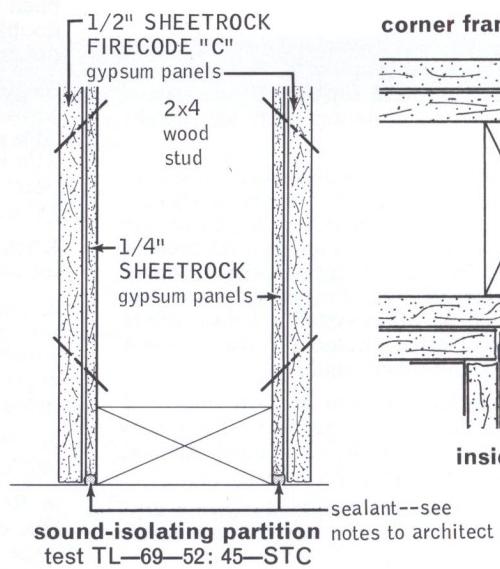
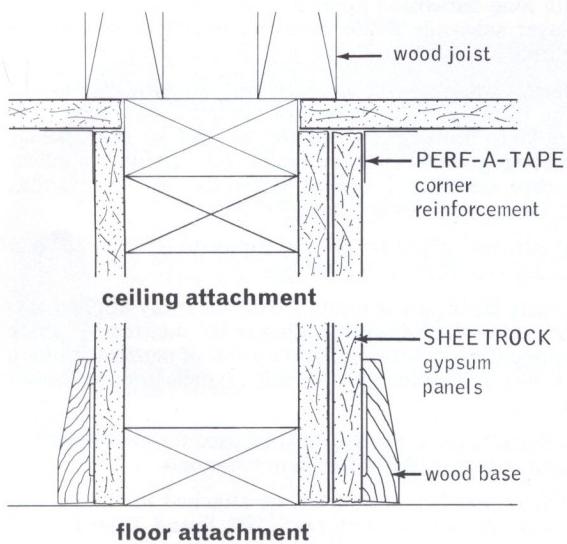
NOTE: Partition width based on 3¾" stud width.

wall furring applications

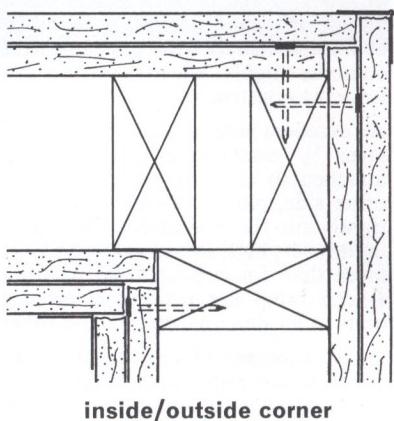
—	RC-1 Resilient Channels 24" o.c.—½" Foil-Back SHEETROCK gypsum panels screw attached—joints finished	—	—	RC-1 channel reduces transfer of structural stresses to surface
—	Wood furring strips 16" o.c.—½" Foil-Back SHEETROCK gypsum panels—joints finished	—	—	Surface not isolated from structural stresses

For ceiling applications, see page 6; for area separation walls, see page 9.

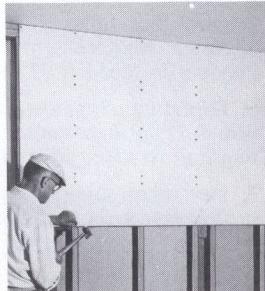
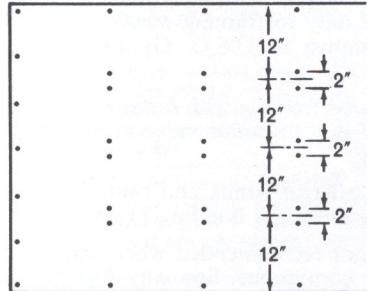
details/partitions



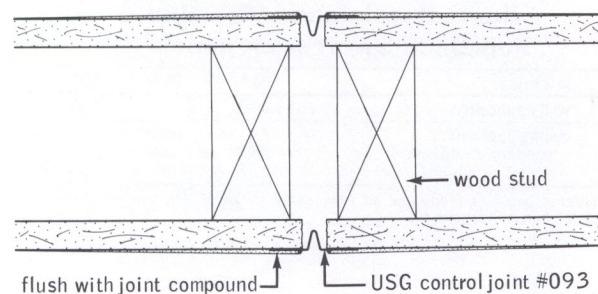
corner framing details



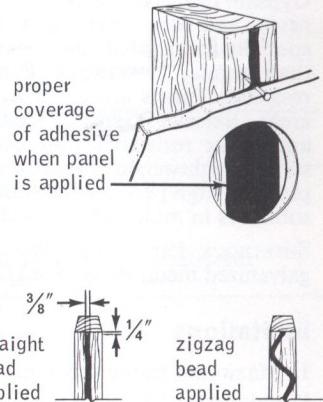
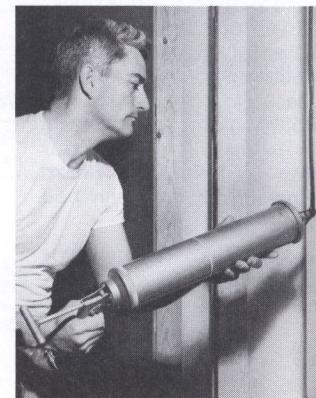
double nailing application



wall control joint

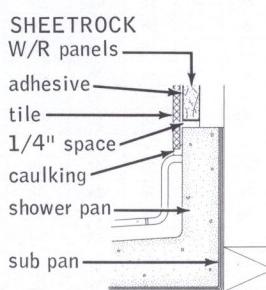
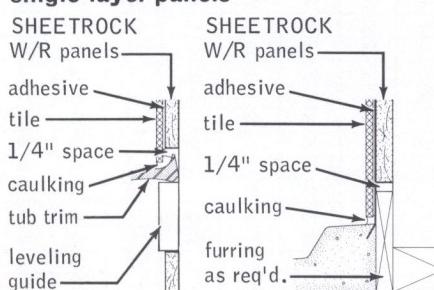


adhesive nail-on application

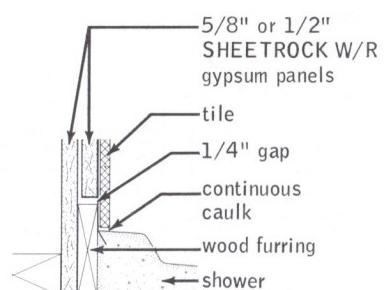
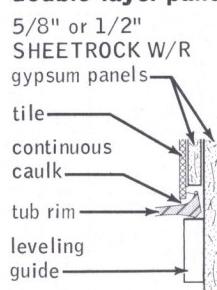


tub and shower details—SHEETROCK W/R panels

single-layer panels

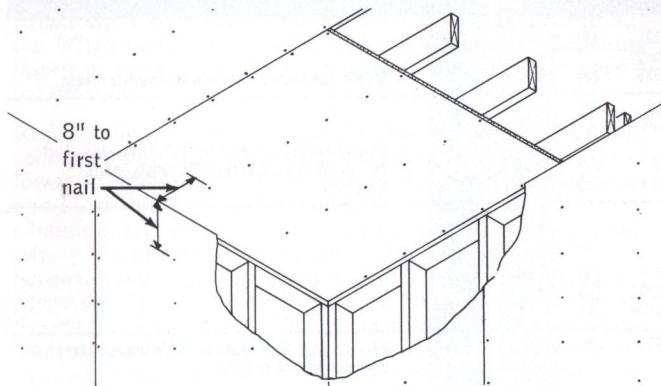


double-layer panels

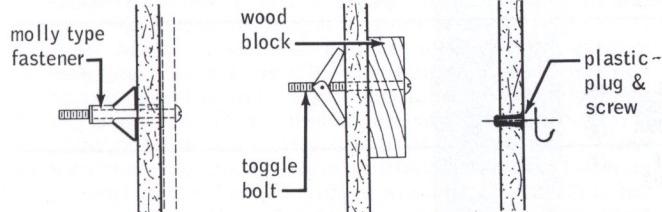


details/partitions

floating interior angle system

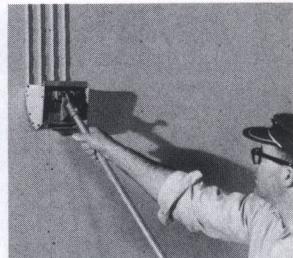
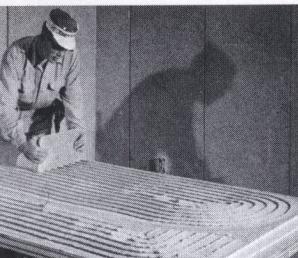


fixture attachments—light



fastener load table

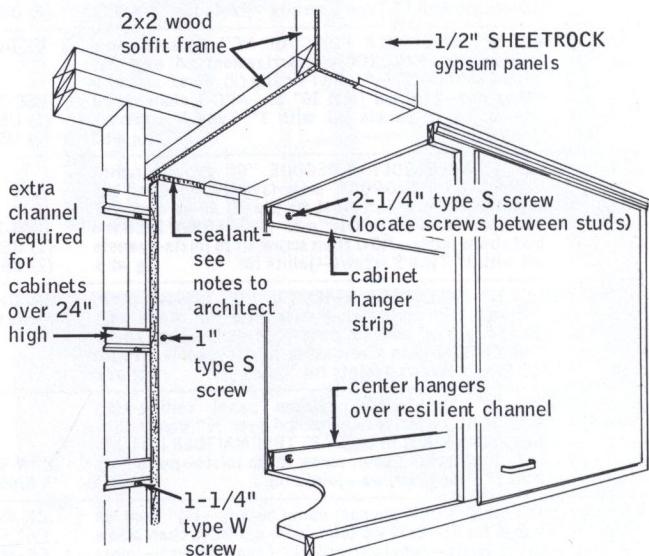
type fastener or attachment	allowable withdrawal resistance—lbs.	allowable shear resistance—lbs.
¼" molly bolt into ½" SHEETROCK Panels only	35	80
¼" toggle bolt into ½" SHEETROCK Panels only	40	60
No. 8 sheet metal screw in plastic plug	20	40



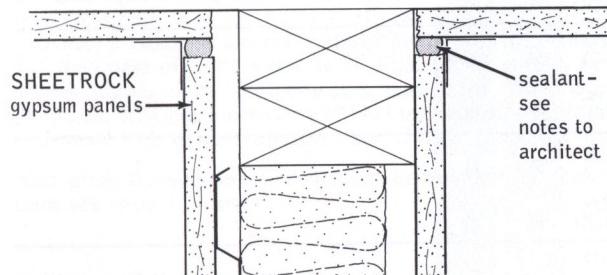
sheet lamination

strip lamination

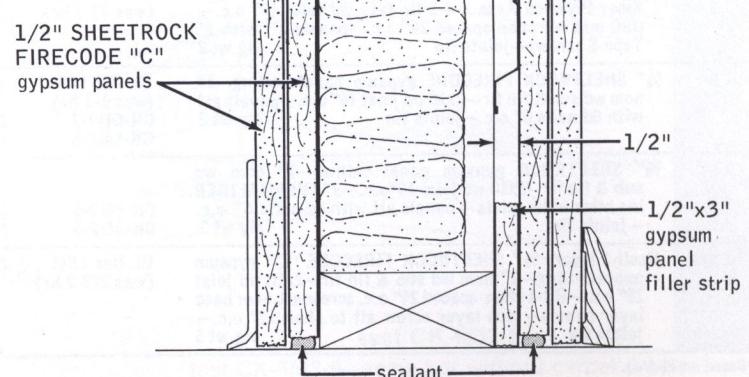
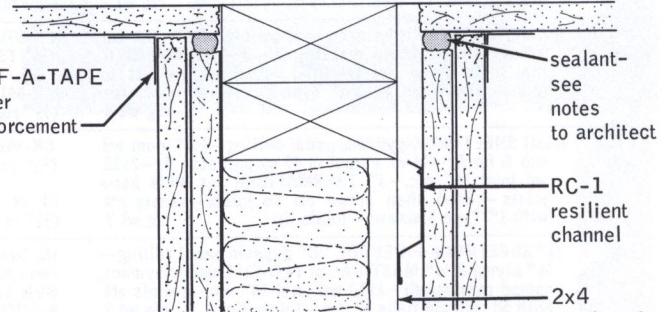
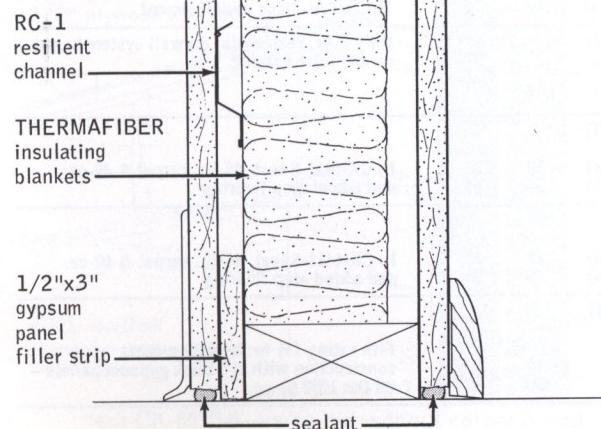
cabinet attachment



ceiling attachments



floor attachments



test data/ceilings

fire rating	description	test no.	sound rating		comments
			STC	IIC	
1 hr.	½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin clg wt 3	UL Des L512 (was 42-1 hr) NBS-77 P-716	(f) (s)	36†	Basic assembly—sound attenuation test
1 hr.	Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom plywd & MASTICAL or FLO-FILL underlayment compd or wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L514 (was 41-1 hr) BBN-740407 BBN-740405	(f) (s) (s)	54 55	Sound ratings based on ¾" FLO-FILL and ½" plywood subfloor; IIC with carpet and pad
1 hr. est	Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—¾" FLO-FILL underlayment compd—¾" plywd subflr—(1) ½" vinyl flr tile (2) 66-oz. carpet & 40-oz pad—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts btw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	USG-740704 (1) USG-740703 (2) USG-740705	(s) (s) (s)	59 47 65	
1 hr.	Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—¾" PYROROCK underlayment bd over ½" plywd subflr—(1) ½" vinyl flr tile (2) 66-oz carpet & 40-oz pad—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L523 USG-740307 (1) USG-740302 (2) USG-740308	(f) (s) (s) (s)	49 45 58	Fire rating also applies with direct-attached gypsum panel ceiling. Sound ratings based on ½" thick gypsum panels
1 hr. est	Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—¾" PYROROCK underlayment bd over ½" plywd subflr—(1) ½" vinyl flr tile (2) 66-oz carpet & 40-oz pad—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts btw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	BBN-720503 (1) BBN-720502 (2) BBN-720501	(s) (s) (s)	55 52 64	
1 hr.	Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1½" perlite-sand conc over ½" plywd subfloor—2x10 wd joist 16" o.c.—3" glass fiber batts btw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L516 (was 62-1 hr)	(f)	N/A	
1 hr. est	Resil ½" SHEETROCK gypsum panel ceiling—¾" MASTICAL underlayment compd over ½" plywd subflr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts btw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	BBN-670601 & 670602	(s)	56 54	
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-6 (½" FIRECODE "C") CK-6412-10 (½" reg SHEETROCK)	(s) (s)	47 47	39 39
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-7 (½" FIRECODE "C") CK-6412-9 (½" reg SHEETROCK)	(s) (s)	47 48	67 66
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts btw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-9 (½" FIRECODE "C") CK-6412-3 (½" reg SHEETROCK)	(s) (s)	51 50	46 46
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts btw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-8 (½" FIRECODE "C") CK-6412-4 (½" reg SHEETROCK)	(s) (s)	52 51	71 70
1 hr.	½" SHEETROCK FIRECODE "C" gypsum panel ceiling—½" plywd & ¾" MASTICAL or FLO-FILL underlayment compd over subflr—2x10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin clg wt 3	UL Des L512 (was 42-1 hr) BBN-671007 & 671008	(f) (s)	48	35
1 hr.	½" SHEETROCK FIRECODE gypsum panel ceiling—Amer Plywood Assn 2-4-1 flr 4x10 wd joist 48" o.c.—USG met for chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L508 (was 28-1 hr)	(f)	N/A	Only 1-hr. residential drywall system based on 48" joist spacing
1 hr.	½" SHEETROCK FIRECODE gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—panels att with 6d nails 6" o.c.—joints fin clg wt 3	UL Des L501 (was 1-1 hr) CK-6412-7 CK-6412-8	(f) (s) (s)	38 39	32 56
1 hr. est	½" SHEETROCK gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts btw joists—panels att with 6d nails 6" o.c.—joints fin clg wt 3	CK-6412-6 CK-6412-5	(s) (s)	41 40	32 58
2 hrs.	Resil 2 layers ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c. screw att over base layer panels—face layer screw att to chan 12" o.c.—joints fin clg wt 5	UL Des L511 (was 272-2 hr)	(f)	50 est	Fire rating 1½ hr. based on same construction with ½" thick gypsum panels—UL Des L510 (f)

†Based on 11-freq.

description/ceilings

In single-layer ceiling assemblies, SHEETROCK Gypsum Panels are applied across the supports and fastened with nails or screws. Nails are spaced 6" to 7" o.c. (6" for fire-rated construction); 1 1/4" USG Brand Type W Screws are spaced 12" o.c. Where no fire rating is required, adhesive nail-on fastening improves bond strength and reduces face nailing (see page 4 for details).

Resilient channel systems offer fire-resistant wood joist floor/ceiling assemblies having highly efficient sound isolation at low cost—qualities particularly needed in apartments, motels and other multi-family buildings. RC-1 SHEETROCK Resilient Channels are screw-attached across wood joists; gypsum panels are attached to channels with USG Brand Type S Screws. A one-hour fire rating is available with 1/2" SHEETROCK FIRECODE "C" Gypsum Panels. With a double-layer 5/8" SHEETROCK FIRECODE "C" Panels separated by RC-1 Resilient Channels, a 2-hour rating is provided. When 3" THERMAFIBER Insulating Blankets are installed between joists, airborne and impact sound ratings are greatly improved (see table, left).

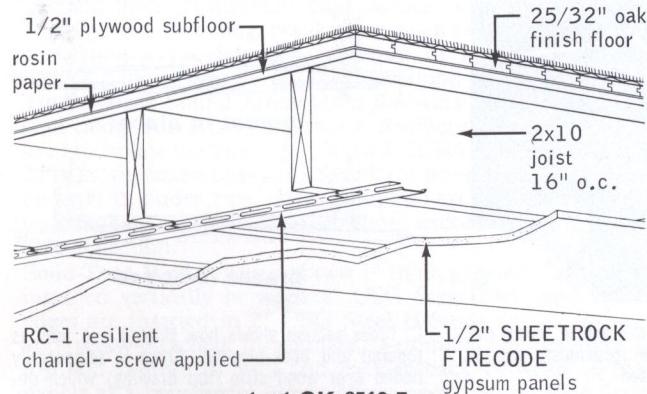
Floor/ceiling sound resistance is improved by using underlayment compound or special gypsum board over plywood subfloor. MASTICAL and FLO-FILL are super-strength gypsum underlayment compounds which are poured in place over plywood and troweled smooth. PYROROCK Sound Underlayment Board, a specially formulated square-edge gypsum board, is nail-attached for completely dry floor construction. These underlays produce a durable surface suitable for finishing with carpet and pad, resilient tile or wood parquet. With either directly or resiliently attached gypsum panel ceilings, these structural subfloor systems also provide excellent fire resistance which makes them suited for motels and multi-story apartments (for details and specifications, see U.S.G. Bulletins IR-165 for MASTICAL, IR-552 for PYROROCK).

Exterior Soffits—eaves, canopies and carports and other exterior soffit applications with indirect exposure to the weather are quickly and economically completed with USG Exterior Gypsum Ceiling Board fastened directly to joists (see U.S.G. Bulletin WB-1152 for detailed specification).

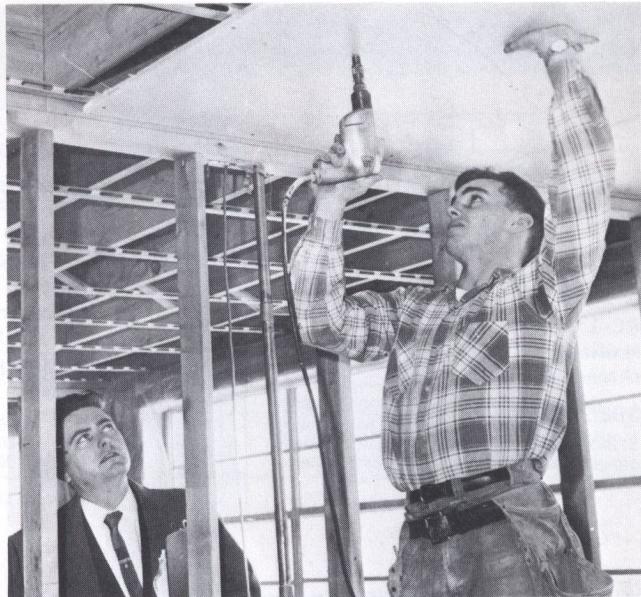
Radiant Heated Ceilings—specially formulated components are also used extensively in electric cable radiant heated ceilings. A single layer of USG R.H. Base, attached to joists, provides a base for electric radiant heat cable and following 1/4" thickness of SHEETROCK R.H. Filler. This special system allows higher cable temperatures than with other gypsum products, provides more efficient heat transmission and greater resistance to heat deterioration. See U.S.G. Bulletin P-480.

Maximum frame spacing and other limitations for these systems are shown on page 3.

ceiling and floor assemblies



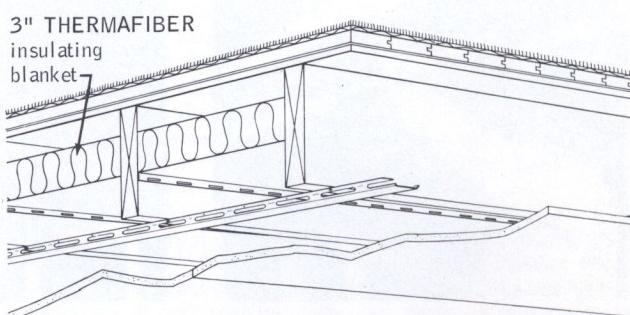
test CK-6512-6—same but without carpet & pad



resilient ceiling application



direct ceiling application

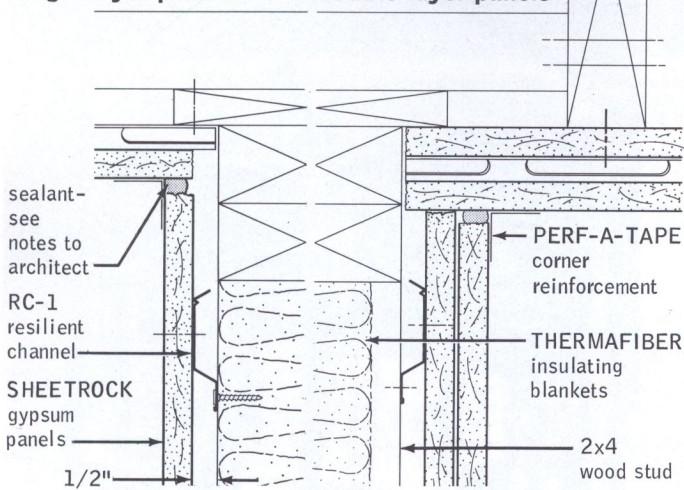


test CK-6512-8

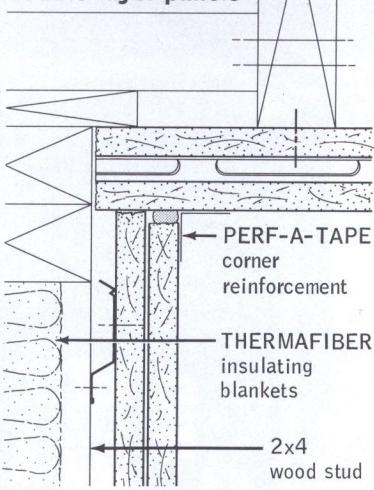
test CK-6512-9—same but without carpet & pad

details/ceilings

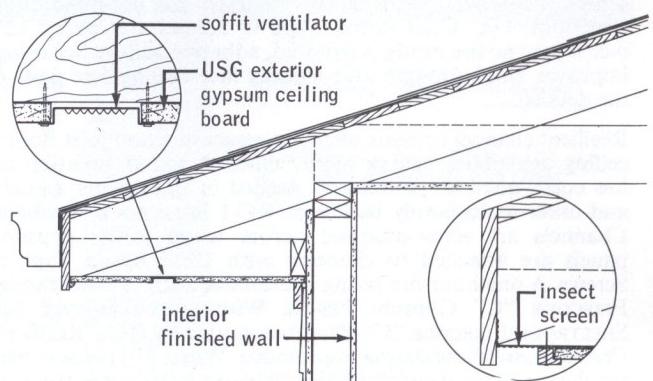
single-layer panels



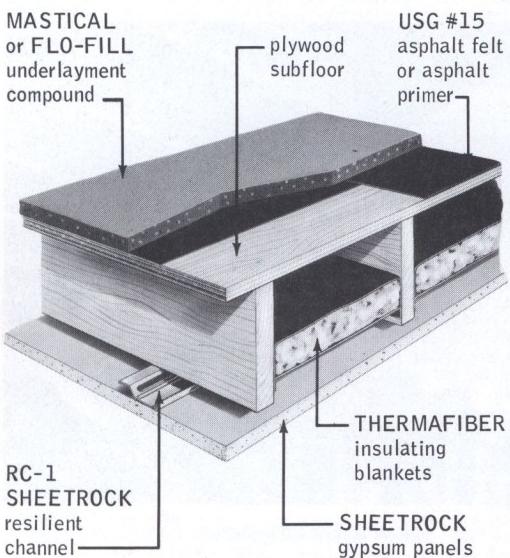
double-layer panels



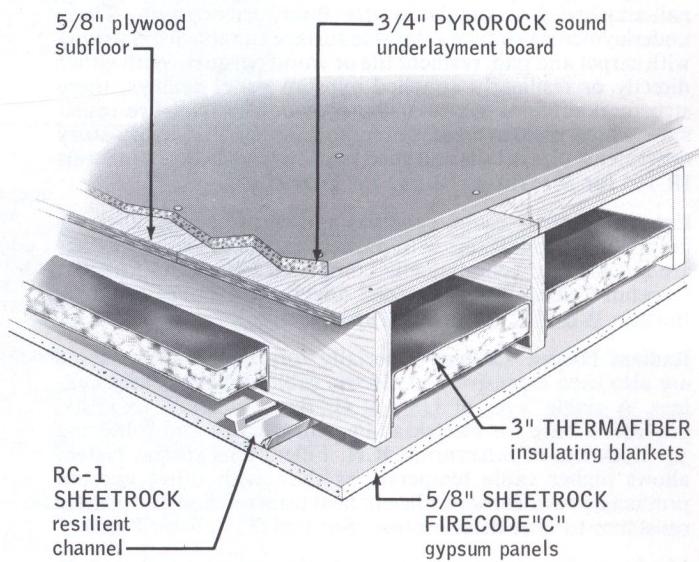
exterior soffit



underlayment compound application



underlayment board application

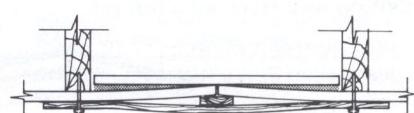


back-blocking procedure



A. Gypsum panels are applied with long edges at right angles to joists. Backing blocks 8" wide, cut from scrap panels, are cemented and placed along full length of edge and ends of panels. Floating of end joints compensates for a twisted stud or joist.

B. Immediately after all blocks are in place, the next panel, which had been previously cut, is erected. Ends are loosely butted.



braces in place



braces removed

C. Cross section shows how floated end joint is tapered and back-blocked. Brace is temporarily nailed over wood strip (top drawing) which depresses ends of panels. When strips are removed, tapered formation remains as shown at bottom.

area separation walls

fire rating	description	test no.	stc rating		comments
			11-f	16-f	
2 hrs.	Cavity Area Separation Wall—½" SHEETROCK W/R FIRECODE "C" gypsum panels—1" USG gypsum liner panels set betw USG stl C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked wt 9 width 3½"	U of C 6-23-75 (f)			
2 hrs. est	Cavity Area Separation Wall—½" SHEETROCK W/R FIRECODE "C" gypsum panels—1" USG gypsum liner panels set betw USG stl C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels—1½" THERMAFIBER sound atten blkts—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked wt 10 width 4"	BBN-750706 (s)	47		BBN-750706 based on 1" THERMAFIBER sound atten. blankets in cavity
2 hrs. est	Solid Area Separation Wall—¾" SHEETROCK FIRECODE "C" gypsum panels—two 1" gypsum liner panels set betw USG stl H-studs 24" o.c.—2x3 16" o.c. ea side on 2x3 plates 1" from liner panels—gypsum panels att with 1¼" Type W screws 12" o.c.—joints stag & fin—perim caulked wt 16 width 10½"	BBN-750411 (s)	50		
3 hrs. est	Cavity Area Separation Wall—½" SHEETROCK W/R FIRECODE "C" gypsum panels—1" USG gypsum liner panels set betw USG stl C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels—1½" THERMAFIBER sound atten blkts—single layer panels one side appl vert & screw att—2 layers opp side screw att to chan—base layer appl horiz—face layer appl vert—joints fin—perim caulked wt 14 width 4¾"	BBN-730104 (s) BBN-730103 (s) BBN-730102 (s)	45 54 57		BBN-730103 based on 2" THERMAFIBER sound atten. blankets in one cavity. BBN-730102 based on 2" THERMAFIBER sound atten. blankets in both cavities
		BBN-730622 (s)	57		

description

USG Area Separation Walls are remarkable new developments for constructing common walls with fire-resistant protection for adjacent properties. These lightweight, non-load bearing gypsum drywall assemblies are designed as vertical fire barriers separating occupancies in wood-frame apartments and townhouses. They are the essence of simplicity—large-size gypsum panels attached to steel studs and runners quickly become thin, space-saving walls offering remarkable acoustical privacy. Their engineered performance and low labor and material costs make these systems superior to the usual masonry construction.

Available in two basic systems both providing fire-resistant walls from ground level to roof:

Cavity Type, with integral interior gypsum panel surfaces for commonly shared party walls between apartments.

Solid Type, with separately framed interior gypsum panel surfaces both sides of fire barrier; slightly higher cost.

Cavity-Type Wall consists of steel C-H Studs and gypsum liner panels set in steel runners and faced both sides with SHEETROCK W/R FIRECODE "C" Gypsum Panels. Liner panels, 1" thick, are erected vertically with ends set into 2½" USG J-Runners and edges inserted into specially formed 2½" USG Steel C-H Studs screw-attached to runners. J-runners are installed singly at top and bottom of wall and back-to-back between vertical liner panels on a line 3" above each intermediate floor. Aluminum clips, which attach the studs to adjacent wood framing, break away when exposed to fire, thus permitting a fire-damaged structure to fail while the fire barrier remains intact. To improve sound transmission loss, THERMAFIBER Sound Attenuation Blankets are inserted in the stud cavity and RC-1 SHEETROCK Resilient Channels may be used to isolate the face layer. With 212CH5 steel studs spaced 24" o.c., the assemblies are suitable for floor-to-ceiling heights up to 11 ft. under 5-psf lateral load and up to 8 ft. as exterior walls under 15 psf wind load without exceeding 1/240 allowable deflection.

Solid-Type Wall consists of two 1" thick gypsum liner panels installed vertically between 2" USG Steel J-Runners. Panel edges are inserted in 2" USG Steel H-Studs spaced 24" o.c. and screw-attached to runners. J-runners are installed at top and bottom of wall and back-to-back between vertical panels at a convenient height above each intermediate floor. Back-to-back horizontal runners are attached to wood fram-

ing with 16-ga. aluminum angle clips which break away in the same fashion as with cavity-type walls. With 24-ga. steel H-studs, the assembly is suitable for floor-to-ceiling heights up to 10 ft. without exceeding 1/240 allowable deflection under 5-psf lateral load.

Components used in these systems are designed to permit temporary exposure to inclement weather during construction. Moisture-resistant paper facings on USG Gypsum Liner Panels shed water, protect the special fire-resistant core. Runners and studs for these systems are formed from hot-dipped galvanized steel for added corrosion resistance. The THERMAFIBER Sound Attenuation Blankets are wrapped in vinyl film to resist water damage. SHEETROCK W/R FIRECODE "C" Panels have a water-resistant gypsum core encased in multi-layered paper chemically treated to combat moisture penetration. These panels, ½" or ¾" thick and 4 ft. wide with tapered edges, are available in lengths up to 12 ft. to meet job requirements.

function and utility

These systems may be used in buildings up to four stories high and with all common floor-ceiling heights found in multi-family housing. Both cavity and solid types are suitable for exterior walls with appropriate weather-resistant facing when offset sloping roofs are desired; also for use with flat decks of wood or poured gypsum concrete.

Fire Resistance—Both types of USG Area Separation Walls offer 2-hr. fire ratings; the cavity type also offers a 3-hr. rating (see table above).

Sound Isolation—STC ratings up to 57 are available in both types (see table above).

Lightweight—These drywall assemblies weigh at least 50% less than masonry walls usually used. Their light weight speeds installation.

Space-Saving—Use of these assemblies gains valuable floor space. Thickness is 3½" to 4" for Cavity Type Walls, compared to 8" to 12" for a masonry wall without interior finish.

Weather Resistance—Moisture-resistant components permit installation in any weather men can work—eliminate many costly winter construction delays.

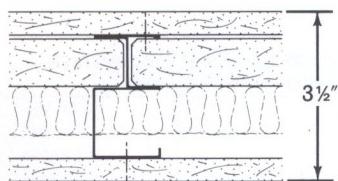
limitations

Non-load bearing; max. frame spacing: 24".

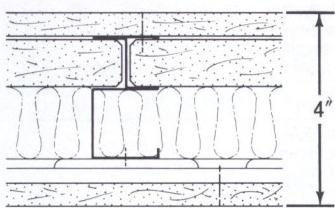
area separation walls

rated assemblies

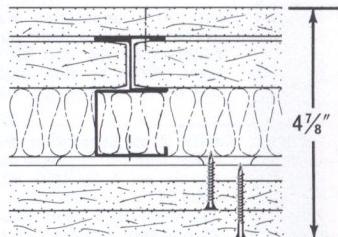
cavity walls



2 Hrs. est. based on U of C 6-23-75
47 STC est. based on BBN-750706

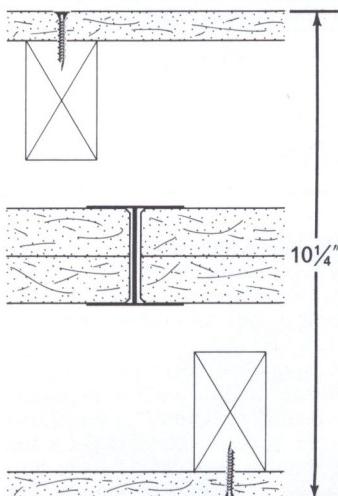


2 Hrs. est.
50 STC—BBN-750411

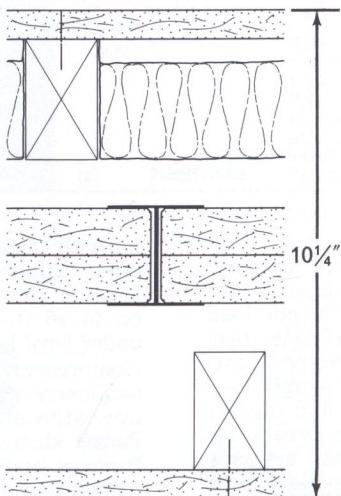


3 Hrs. est. based on U of C 2-16-72
57 STC—BBN-730622

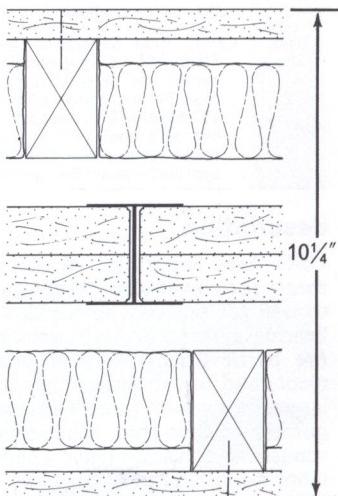
solid walls



2 Hrs. est. based on T-4481-OSU
45 STC—BBN-730104—no blkts.

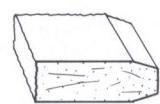


2 Hrs. est. based on T-4481-OSU
54 STC—BBN-730103—blkts. 1 side

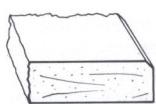


2 Hrs. est. based on T-4481-OSU
57 STC—BBN-730102—blkts. 2 sides

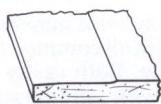
components



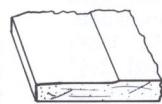
1" USG gypsum liner panel (C-H stud)



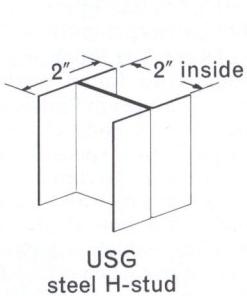
1" USG gypsum liner panel (H-stud)



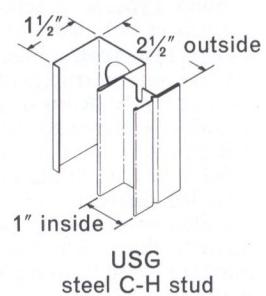
SHEETROCK W/R FIRECODE "C" gypsum panel



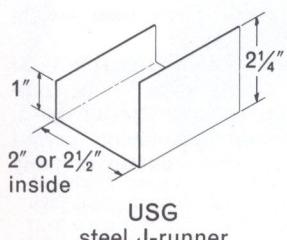
SHEETROCK FIRECODE "C" gypsum panel



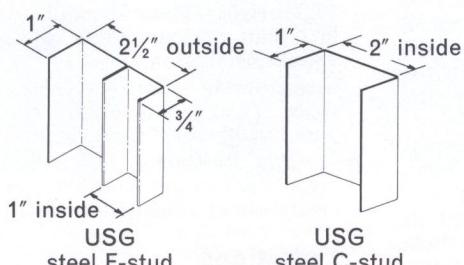
USG steel H-stud



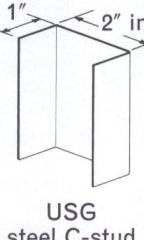
USG steel C-H stud



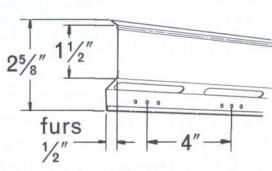
USG steel J-runner



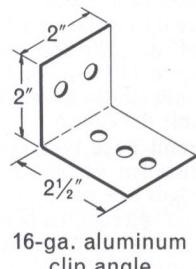
USG steel E-stud



USG steel C-stud



RC-1 SHEETROCK resilient channel

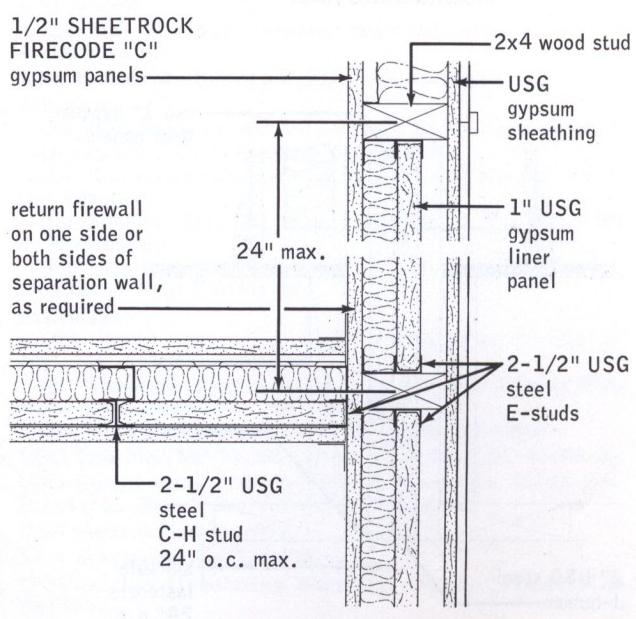
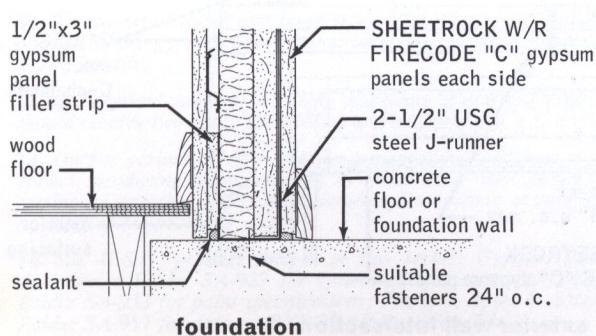
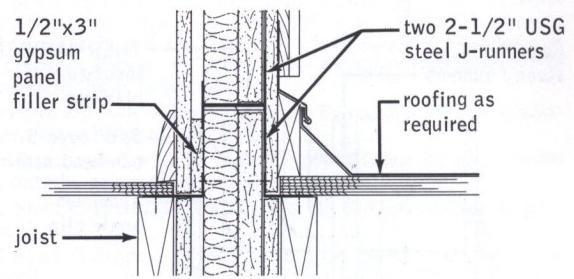
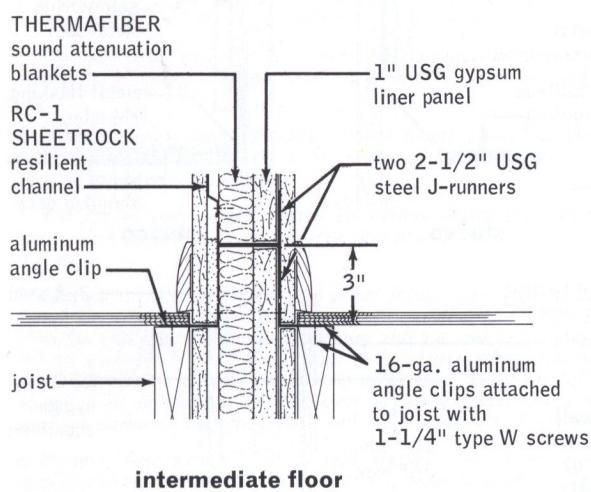
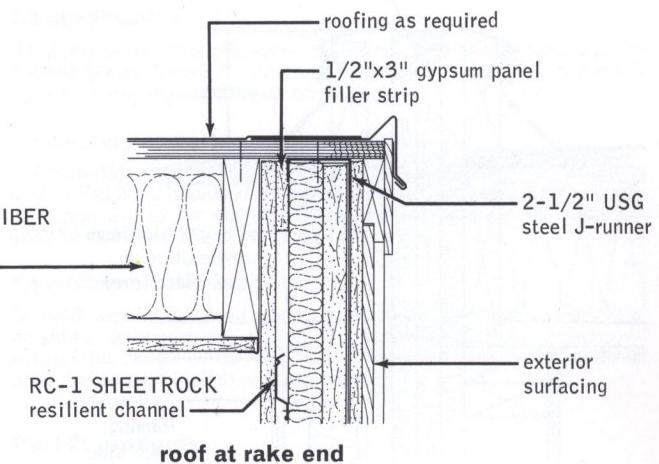
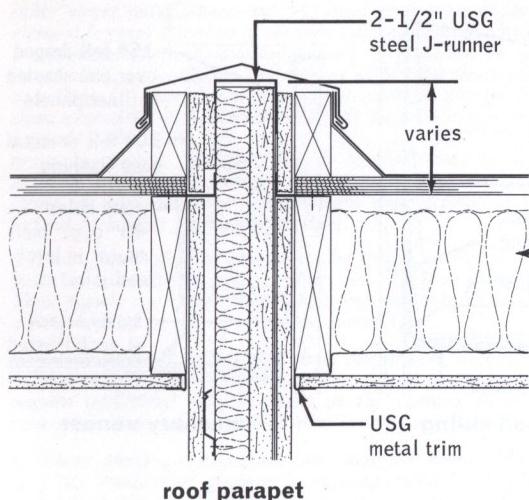


16-ga. aluminum clip angle

area separation walls/cavity type

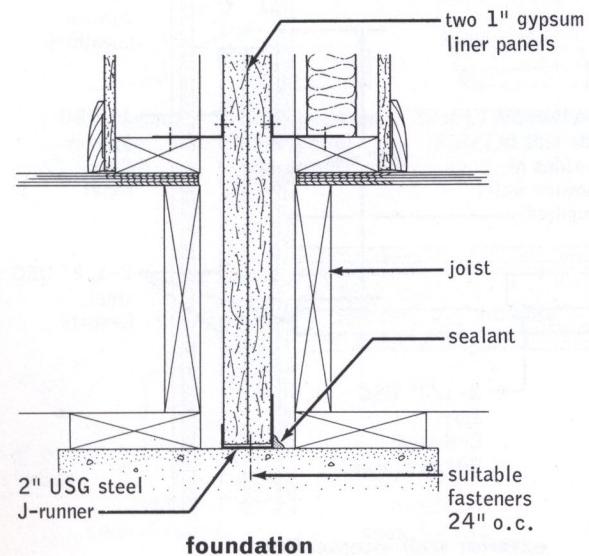
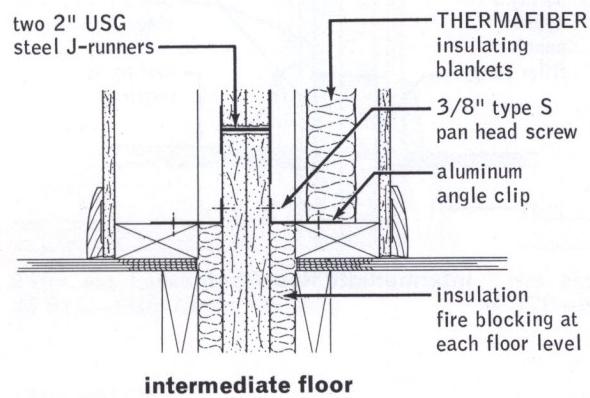
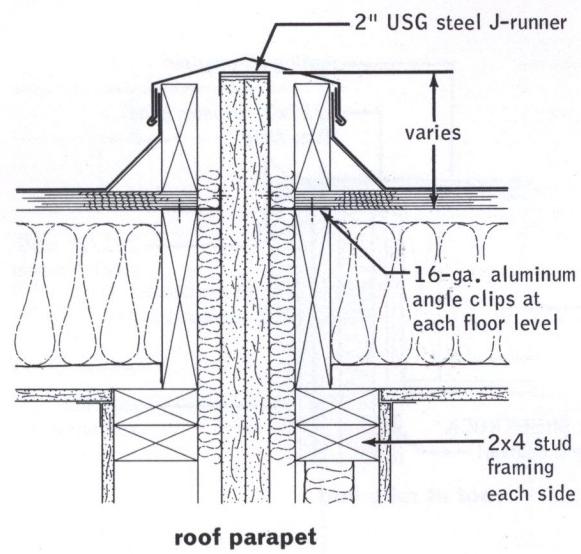
USG Drywall/Wood Frame Systems

924

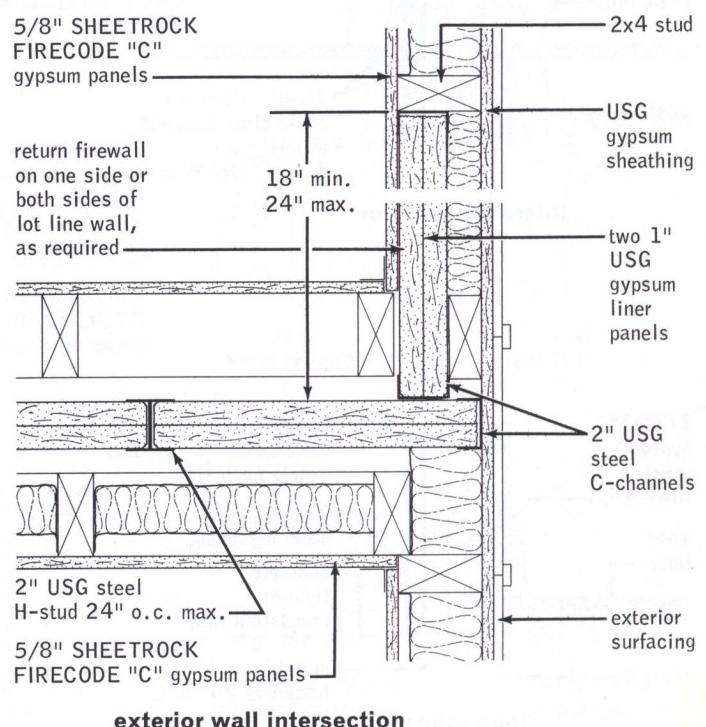
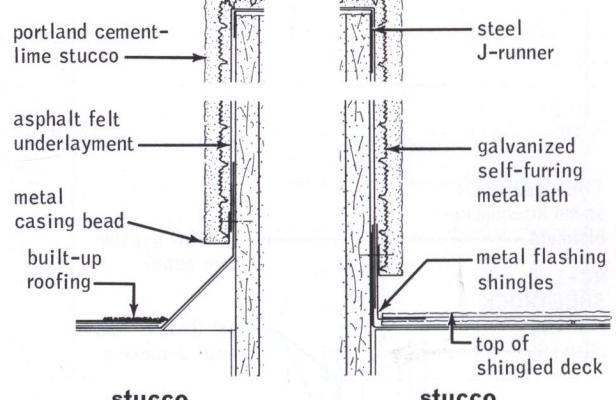
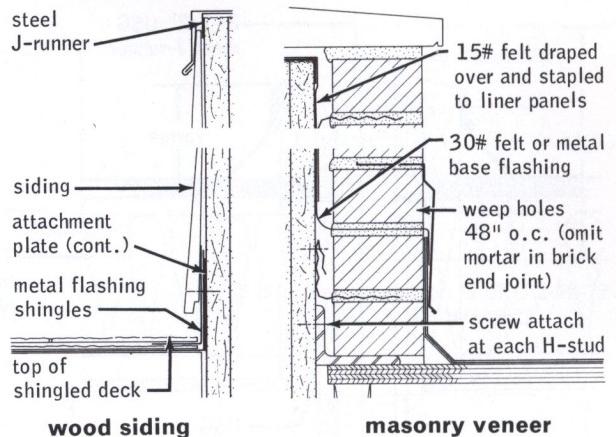


area separation walls/solid type

scale: 1½" = 1'-0"



optional roof intersections



specifications

notes to architect

1. Gypsum panel surfaces should be isolated with control joints or other stress relief where: (a) partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling; (b) ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration; (c) construction changes within the plane of the partition or ceiling; (d) partition or furring run exceeds 30'; (e) ceiling dimensions exceed 50' in either direction; (f) the area within ceiling sections exceeds 2,500 sq. ft.; (g) wings of "L", "U" and "T"-shaped ceiling areas are joined; (h) expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.

Gypsum panel surfaces should not be firmly anchored across the flat grain of wide dimensional lumber such as floor joists and headers. Float panels over these members using resilient channels or provide a control joint to counteract wood shrinkage.

2. Penetrations of the gypsum panel diaphragm, such as door frames, borrowed-light openings, vents, grilles, access panels and light troffers, require additional reinforcement at the corners to distribute concentrated stresses if a control joint is not used.

3. Where these constructions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the assembly. Flanking paths and back-to-back penetrations of the diaphragm should be eliminated. Exterior wall surfaces should be resiliently mounted to minimize flanking paths between floor and ceiling construction. Door and borrowed-light openings are not recommended in sound control partitions.

4. For adhesive applications of TEXTONE Vinyl-faced Panels, only DURABOND Adhesives are recommended; other adhesives may not be compatible with the vinyl surface.

5. Ceramic Tile—SHEETROCK W/R Gypsum Panels are recommended as a base for adhesive application of ceramic, metal and plastic tile.

6. Wood Framing Requirements—Wood framing meeting the minimum requirements of HUD, ALSC and local building codes is necessary for proper performance.

7. Plenum or attic space closed by ceiling installation should be vented with a min. $\frac{1}{2}$ sq. in. net free vent area per sq. ft. of horizontal surface.

8. Ridging or deformation at the panel joints may occur in gypsum board construction under adverse job or weather conditions. Back-blocking end joints will minimize joint ridging and is recommended. Where back-blocking is used, float the end joints between supports and back-block with an 8" wide strip of gypsum board the full length of the joint adhesively applied over abutting ends. For fire-rated resilient construction, back butt end joints with RC-1 Channels.

9. Fixture Attachment—Lightweight fixtures and trim should be installed using plastic plugs or other expandable anchors for screw attachment. Medium and heavyweight fixtures are not recommended on resilient surfaces, but if required, they should be supported from the primary framing.

10. The $1\frac{1}{2}$ " USG Brand Type G Screw is not recommended for fastening double-layer laminated $\frac{3}{8}$ " gypsum panels. In this assembly, use scaffold nails driven through gypsum blocks into the framing at third points vertically, or temporary shoring.

11. Treatment of joints and screwheads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.

12. All exposed surfaces of USG Exterior Gypsum Ceiling Board should receive two coats of U.S.G. exterior paint.

13. During periods of low outside temperature, airborne dirt may collect, producing photographing or shadowing over fasteners and furring of exterior walls. This natural phenomenon occurs through no fault of the products.

14. See U.S.G. product folders in this series: Gypsum Panels & Accessories Folder SA-927 for system components; Paint Products Folder SA-933 for paint specifications; Plasters, Bases & Accessories Folder SA-917 for data on PYROBAR Partition Tile.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

- a. Gypsum Board—48" wide— $(\frac{1}{4})$ ($\frac{3}{8}$) ($\frac{1}{2}$) ($\frac{5}{8}$) thick (Regular) (Foil-Back) SHEETROCK Gypsum Panels; ($\frac{1}{2}$) ($\frac{5}{8}$) thick SHEETROCK FIRECODE ("C") Gypsum Panels; $\frac{1}{2}$ " thick TEXTONE Gypsum Panels (type) (finish); ($\frac{1}{2}$) ($\frac{5}{8}$) thick SHEETROCK W/R Gypsum Panels; ($\frac{1}{2}$) ($\frac{5}{8}$) thick SHEETROCK W/R FIRECODE "C" Gypsum Panels; $\frac{1}{2}$ " thick USG Exterior Gypsum Ceiling Board—lengths as required.
- b. Underlayment—48" wide— $\frac{3}{4}$ " thick PYROROCK Sound Underlayment Board—lengths 6' and 8'.
- c. Liner Board—24" wide 1" USG Gypsum Liner Panels, beveled edge, lengths as required.
- d. USG Steel C-H Studs 212CH5, hot-dipped galvanized, lengths as required.
- e. USG Steel H-Studs 200HS7, hot-dipped galvanized, lengths as required.
- f. USG Steel E-Studs 212ESS5, hot-dipped galvanized, lengths as required.
- g. USG Steel C-Studs 200CS7, hot-dipped galvanized, lengths as required.
- h. USG Steel J-Runners (200JR7) (212JR7), hot-dipped galvanized, x 10' lengths.
- i. Angle Clip—2" x 16-ga. aluminum angle clip, length as required—obtain locally.
- j. Joint Treatment—(select a U.S.G. Joint System).
- k. Adhesive
 - (for Back-Blocking and Fire-Rated Double-Layer Systems)
 - DURABOND Joint Compound-Taping or 90.
 - (for Non-Rated Double-Layer Systems)—DURABOND 500 or 600 Adhesive.
 - (for Adhesive Nail-On Panel Application)—DURABOND 200 or 300 Adhesive.
 - (for Non-Rated Systems—specify with adhesive above)—DURABOND Vinyl Foam Tape.
- l. Fasteners
 - USG Brand Screws (1 $\frac{1}{4}$ " Type W) (1 $\frac{1}{2}$ " Type G) ($\frac{3}{8}$ ", 1", 1 $\frac{1}{8}$ ", 1 $\frac{1}{4}$ ", 1 $\frac{1}{16}$ ", 1 $\frac{1}{8}$ " Type S).
 - (for Non-Rated Systems)—1 $\frac{1}{4}$ ", 1 $\frac{3}{8}$ " GWB-54 Annular Ring Nails—obtain locally.
 - (for Fire-Rated Systems)—specify from fire test report.
- m. USG Trim No. (200-A) (200-C) (401) (402) (P-1) (801-A) (801-B).
- n. USG Corner Bead—(No. 103 DUR-A-BEAD) (No. 104 DUR-A-BEAD) (No. 800) Metal Corner Reinforcement.
- o. USG Control Joint No. 093.
- p. RC-1 SHEETROCK Resilient Channel.
- q. THERMAFIBER (Insulating Blankets) (Sound Attenuation Blankets).
- r. USG Acoustical Sealant.

Part 3: execution

3.1 single-layer systems

3.1.1 gypsum panel erection—direct attachment

Apply gypsum panels to ceilings first, then to walls. Place panels (horizontally—right angles to framing) (vertically—parallel to framing). Position all ends over framing members in vertical application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses. Place end joints on opposite sides of partitions on different studs. When necessary, cut ends, edges and cutouts within the field of the panel in a workmanlike manner.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space perimeter fasteners at least $\frac{3}{8}$ " from ends and edges. Drive nails home with heads slightly below surface of panels to provide a uniform dimple. Do not use a nail set; avoid breaking face paper.

Attach gypsum panels to framing supports by:

- a. **Standard single nailing method**—Attach panels with specified nails spaced 7" o.c. max. for ceilings, 8" o.c. max. for walls.
- b. **Adhesive-nail-on method**—Attach gypsum panels with DURABOND (200) (300) Adhesive applied in a continuous $\frac{3}{8}$ " bead at center of attachment to face of framing members. Where two panels meet on a framing member, apply a serpentine bead with an 8" repeat pattern permitting adhesive contact to both panels. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following panel erection, apply fasteners per manufacturer's directions. Impact panel by hand along framing to insure good contact at all points.
- c. **Double-nailing method**—Attach gypsum panels with nails spaced 12" o.c. with second nails in close proximity (2").
- d. **Power-driven USG Brand Screws**—Attach gypsum panels with 1 $\frac{1}{4}$ " USG Brand Type W screws—spaced 12" o.c. max.
- e. **DURABOND Vinyl Foam Tape**—Attach gypsum panels, using DURABOND (200) (300) Adhesive and DURABOND Vinyl Foam Tape applied in 8" long strips according to manufacturer's directions.

3.1.2 predecorated TEXTONE Gypsum Panel erection

Before application, pre-bow panels to a 2" permanent bow convex to face of studs. Apply pre-bowed panels vertically to framing spaced (16") (24") o.c. Position less-than-full-width panels with cut edge at corner.

Apply DURABOND (200) (300) Adhesive in continuous $\frac{3}{8}$ " beads to face of studs in field of panel and in two $\frac{3}{8}$ " beads at extreme edges of studs at vertical joints. Position panels within 15 min. after adhesive application and mechanically fasten 16" o.c. along ceiling and floor edges of panels. Impact panel by hand along framing to insure good contact at all points.

Finish panel joints, edges and corners with TEXTONE Mouldings matching specified panel finishes and installed according to manufacturer's directions.

3.1.3 SHEETROCK W/R Gypsum Panel erection

a. **Framing**—If necessary, fur out studs so inside face of shower receptor is flush with gypsum panel face. Install appropriate blocking or headers to support tub and other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and other hardware. When studs are more than 16" o.c., or when ceramic tile over $\frac{5}{16}$ " thick will be used, install suitable blocking between studs. Place blocking approximately 1" above top of tub or receptor and at midpoint between base and ceiling.

b. **Gypsum Panels**—After tub, shower pan or receptor is installed, place temporary $\frac{1}{4}$ " spacer strips around lip of fixture. Pre-cut panels to required sizes and make necessary cut-outs. Before installing panels, apply SHEETROCK W/R Sealant to all cut or exposed panel edges at utility holes, joints and intersections.

Install panels horizontally with paperbound edge abutting top of spacer strip. Fasten panels with nails 8" o.c. max., or screws 12" o.c. max. Where ceramic tile more than $\frac{5}{16}$ " thick will be used, space nails 4" o.c. max. and screws 8" o.c. max. Adhesive-nail-on method (see 3.1.1 b above) may be used for attaching panels when ceramic tile no more than $\frac{5}{16}$ " thick will be used.

In areas to be tiled, treat all fastener heads with SHEETROCK W/R Sealant. Do not apply joint compound to joints or fastener heads

in areas to be tiled. Apply joint treatment only to joints and fasteners *not* to be tiled.

Prior to tile erection, fill all openings around pipes, fittings and fixtures with specified caulking compound. Remove spacer strip but do not caulk gap at bottom edge of panels.

Note—Using an adhesive approved by the tile manufacturer, install tile down to top edge of shower floor or tub and overlapping lip or return of tub or receptor. Fill all tile joints with an unbroken application of grout. Apply caulking compound between tile and shower floor or tub.

3.1.4 back-blocking system

Note—Maximum spacing of supports, 24" o.c. Select Sections a or b, depending upon job requirements. Floating and tapering end joints requires back-blocking. However, end joints may be back-blocked without tapering.

- a. Float, back-block and taper all ceiling end joints except at perimeter of room.
- b. Back-block all ceiling edge joints except at perimeter of room.
- c. Apply SHEETROCK Gypsum Panels with long edges at right angles to framing and with end joints midway between supports. Wood backing behind joints between framing supports is not required. Use $\frac{3}{8}$ " or $\frac{1}{2}$ " thick gypsum backing blocks for $\frac{1}{2}$ " ceiling finish; $\frac{1}{2}$ " or $\frac{5}{8}$ " thick blocks for $\frac{5}{8}$ " ceiling finish. Apply adhesive to face side if foil-backed blocks are used.

3.1.5 floating interior angle system

Apply gypsum panels to ceilings first. Follow standard framing practices for corner fastening. Fit panels snugly at all angles. Apply gypsum panels to walls to maintain firm support for ceiling panels. At horizontal angles, apply the first fastener 8" from the intersection. At vertical interior angles attach the overlapping panel only, at the angle. Use conventional fastening in remainder of area.

3.2 double-layer systems

3.2.1 base layer erection—direct attachment

a. **Ceilings**—Apply gypsum panel base layer on ceilings first (horizontally—right angles to framing) (vertically—parallel to framing). Position end joints to offset face layer joints by at least 10"; joints may occur on or between framing members. Apply foil-back panels with foil side against framing.

b. **Sidewalls**—Apply gypsum panel base layer with long edges centered on framing members (vertically). When predecorated face layers will be used, apply base layer horizontally. Apply foil-back panels with foil side against framing. Attach panels to framing supports by (screw) (nail) attachment as follows:

c. **Screw Attachment**—Attach panels with power-driven 1 $\frac{1}{4}$ " type W screws spaced 12" o.c. max. For walls with studs 16" o.c., screws may be applied 16" o.c. max. Stagger screws on adjoining edges and ends.

d. **Nail Attachment**—Attach panels with specified nails spaced 7" o.c. max. on ceilings, 8" o.c. max. on walls. Drive nails so heads are flush with surface and opposite each other on adjacent ends and edges.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space fasteners $\frac{3}{8}$ " min. from ends and edges.

3.2.2 face layer erection—direct attachment

Use gypsum panels in maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints at least 10" from parallel joints in base layer. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

After panels are cut to size, mix and apply adhesive according to manufacturer's directions and laminate face layer to base layer in the following manner:

Sheet Lamination—For fire-rated construction, apply DURABOND Joint Compound-Taping to entire back surface of face panels and to extreme edges of panels. Apply adhesive in beads approximately $\frac{3}{8}$ " wide at base and $\frac{1}{2}$ " high and spaced 4 $\frac{1}{2}$ " o.c. Laminate face layer to base layer using moderate pressure and temporary support or supplemental fastening as follows:

a. Temporary nailing—Use nails with at least $\frac{3}{4}$ " penetration into framing. Space nails 16" to 24" o.c. When proper bond is developed, remove nails and dimple holes for joint treatment.

b. Temporary supports—Brace or shore face layer every 16" to 24". When proper bond is developed, remove supports.

c. USG Brand Screws—Permanently attach face layer with 1 $\frac{1}{2}$ " type G screws. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" o.c. max. and within 24" of ends.

Strip Lamination—For fire-rated construction, apply DURABOND Joint Compound-Taping or 90 to base layer panels in vertical strips of four 1 $\frac{1}{2}$ " beads, 1 $\frac{1}{2}$ " to 2" o.c. Space strips 24" o.c. Permanently attach face layer with 1 $\frac{1}{2}$ " type G screws placed to penetrate adhesive strips. Space screws along edges 36" o.c. max., within 2" of joint and 12" of both ends. In field of panel, space screws along centerline, 48" o.c. max. and within 24" of ends.

For non-rated construction, laminate face panels to base layer as follows:

DURABOND 500 Adhesive—Apply adhesive in strips using notched spreader having $\frac{1}{4}$ " x $\frac{1}{4}$ " min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten as required. For walls, use pre-bowed panels, erect panels vertically and fasten 16" o.c. at top and bottom of panel. For ceilings, space fasteners 16" o.c. along edges and ends, with one permanent field fastener per framing member at mid-width of panel.

DURABOND 600 Adhesive—Apply adhesive to both contact surfaces; let adhesive air dry until color turns from lighter to darker blue; erect panels as soon as possible after drying. Position panel, press panel firmly in place and fasten as required. For horizontal application to walls and for all ceiling applications, fasten face panel at each corner and along edges spaced 48" o.c. max. For vertical application to walls, use pre-bowed panels and fasten 16" o.c. at top and bottom of panel.

DURABOND Vinyl Foam Tape—Attach gypsum panels, using DURABOND 500 Adhesive and DURABOND Vinyl Foam Tape applied in continuous strips across back face of panel according to manufacturer's directions.

3.2.3 face layer erection—TEXTONE Gypsum Panels

Before application, pre-bow panels to a 2" permanent bow convex to face of studs. Apply pre-bowed panels vertically with joints staggered at least 10" from parallel joints in base layer. Position less-than-full-width panels with cut edge at corner. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

For fire-rated construction, install panels using DURABOND Joint Compound-Taping or 90 as laminating adhesive. Apply adhesive to base layer in vertical strips of four 1 $\frac{1}{2}$ " beads, 1 $\frac{1}{2}$ " to 2" o.c. Space strips 24" o.c. Fasten panels 16" o.c. at top and bottom of panel.

For non-rated construction, install face layers using DURABOND (500) (600) Adhesive as follows:

a. DURABOND 500 Adhesive—Apply adhesive in strips using notched spreader having $\frac{1}{4}$ " x $\frac{1}{4}$ " min. notches spaced 2" o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.

b. DURABOND 600 Adhesive—Apply adhesive to both contact surfaces; let adhesive air-dry until color turns from lighter to darker blue; erect panels as soon as possible after drying. Position panel, press firmly in place and fasten 16" o.c. at top and bottom.

Finish panel joints, edges and corners with TEXTONE Mouldings matching specified panel finishes and installed according to manufacturer's directions.

3.3 resilient attachment systems

3.3.1 resilient channel erection

Position resilient channels at right angles to wood framing, space (16") (24") o.c. and attach to supports with 1 $\frac{1}{4}$ " type W, 1 $\frac{1}{4}$ " type S or 1" type S screws driven through holes in channel mounting flange.

On walls, attach 1 $\frac{1}{2}$ " x 3" wide continuous filler strips to bottom plate. Install channels with mounting flange down, top channel

max. 6" down from ceiling, bottom channel 24" up from floor. Extend channels into all corners and attach to corner framing. Position channels max. 6" from wall-ceiling angle. Cantilever channel ends no more than 6". For double-layer system, attach channel through base layer to framing with 1 $\frac{1}{8}$ " type S screws.

Splice channel by nesting directly over framing member; screw-attach through both flanges. Reinforce with screws located at both ends of splice.

Where cabinets are to be installed, attach RC-1 Channels to studs at center of top and bottom cabinet hanger brackets. When distance between hangers exceeds 24" o.c., install additional channel at midpoint between hangers.

3.3.2 gypsum panel erection—walls

Apply gypsum panels of maximum practical length with long dimension parallel to resilient channel and fastened with 1" type S screws spaced 12" o.c. along channels. Center horizontal abutting edges over screw flange of channel. Where channel resiliency makes screw placement difficult, the next longer screw may be used but do not drive screw directly over stud. For direct attachment, fasten panels to wood studs with 6d nails 8" o.c.

For two-layer application of gypsum panels, apply base layer vertically and attach to resilient channels with 1" type S screws spaced 24" o.c. and to wood studs with 1 $\frac{1}{4}$ " type W screws 12" o.c. Apply face layer with long dimension at right angles to long edges of base layer and fasten with 1 $\frac{5}{16}$ " type S screws spaced 16" o.c.

3.3.3 gypsum panel erection—ceilings

a. Base Layer—For fire-rated assembly, apply gypsum base-layer panels with long edges across joists and end joints staggered. Fasten panels to framing with 8d cement-coated nails spaced 7" o.c. Attach resilient channel through base layer perpendicular to framing with 1 $\frac{1}{8}$ " type S screws.

b. Face Layer—Apply face-layer panels of maximum practical length with long dimension at right angles to resilient channels and end joints staggered. End joints may occur over resilient channels or midway between channels with joint floated and back-blocked. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1" type S screws spaced 12" o.c. in field of panels and along abutting ends. Cut panels neatly and provide support around cutouts and openings.

3.4 area separation wall system

3.4.1 cavity wall

a. Foundation—Position 2 $\frac{1}{2}$ "-wide steel J-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. When specified, caulk runner at foundation with $\frac{1}{4}$ " bead of USG Acoustical Sealant.

b. First floor—Install 1" liner panels and steel studs cut to length 3" more than floor-to-floor height. Erect liner panels vertically in J-runner with long edges in groove of C-H stud. Install C-H studs between panels and cap ends of run with E-stud. Fasten all studs at bottom to J-runner flange with $\frac{3}{8}$ " type S screws.

c. Intermediate floors—Cap top of panels and studs with J-runner and fasten studs to one J-runner flange with $\frac{3}{8}$ " type S screws. Install bottom J-runner for next row of panels over top runner with end joints staggered at least 12". Fasten runners together with double $\frac{3}{8}$ " screws at ends and spaced 24" o.c. Secure each stud to framing with 16-ga. aluminum angle clip, fastened to studs with $\frac{3}{8}$ " screws and to framing or subfloor with 1 $\frac{1}{4}$ " type W screws.

d. Roof—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with J-runner and fasten studs to one flange with $\frac{3}{8}$ " screws. Fasten studs to framing with aluminum clips. Where flat gypsum concrete roof decks are used, secure top of fire barrier assembly to framing with a continuous 20-ga. hot-dipped galvanized steel strip, screw-attached to J-runner and framing.

e. Sound attenuation blankets—Install blankets between studs and attach to liner panel with five 9/16" staples driven through each blanket, one in center and others spaced 3" from each corner. Butt ends of blankets closely and fill all voids.

f. Resilient channels—When specified, install RC-1 Resilient Channels horizontally to face side of studs, 6" above floor 6" below

USG Drywall / Wood Frame Systems

ceiling joists and max. 24" o.c. Attach channels to studs with $\frac{3}{8}$ " type S screws driven through holes in mounting flange. Extend channels to ends of runs and attach to E-studs. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice.

g. Gypsum panels—Apply $\frac{1}{2}$ " SHEETROCK W/R FIRECODE "C" gypsum panels vertically to both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1" type S screws spaced 12" o.c. in field and along edges and runner flanges.

h. Resilient single-layer—Apply $\frac{1}{2}$ " gypsum panels vertically to resilient channels and fasten with $\frac{1}{4}$ " type S screws placed 6" away from stud and 12" o.c. Do not place screws directly over stud.

i. Resilient double-layer—Apply $\frac{3}{8}$ " gypsum panel base layer horizontally to resilient channels with end joints staggered; fasten with $\frac{1}{4}$ " type S screws placed 6" away from stud and 12" o.c. Apply $\frac{5}{8}$ " gypsum panel face layer vertically over base layer and attach with $\frac{1}{8}$ " type S screws spaced 12" o.c. and staggered from those in base layer.

3.4.2 solid wall

a. Foundation—Position 2" wide steel J-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. When specified, caulk runner at foundation with $\frac{1}{4}$ " bead of acoustical sealant.

b. First floor—Install liner panels and H-studs to convenient length more than floor-to-floor height. Install two thicknesses of 1" liner panels vertically in J-runner with long edges in H-stud. Erect H-studs and double-thickness panels alternately until wall is completed. Cap ends of run with C-stud. Fasten all studs to J-runner flange with $\frac{3}{8}$ " type S screws.

c. Intermediate floors—Cap top of panels and studs with back-to-back J-runners screw-attached together with double $\frac{3}{8}$ " type S screws at ends and spaced 24" o.c. Fasten studs to runner flange with $\frac{3}{8}$ " screws. Secure studs to framing with 16-ga. aluminum angle clips screw-attached to studs and framing. Except at foundation, install fire blocking between joists and fire barrier.

d. Roof—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with J-runner and fasten stud to one flange with $\frac{3}{8}$ " screws. Fasten studs to framing with aluminum clips. Where flat gypsum concrete roof decks or short parapet walls are used, secure top of fire barrier assembly to framing with a continuous 20-ga. hot-dipped galvanized steel strip screw-attached to J-runner and nailed to framing.

e. Interior finish—Apply single-layer $\frac{5}{8}$ " SHEETROCK FIRECODE "C" Gypsum Panels to wood studs and joists with screws or nails in conventional manner.

3.5 wall furring systems**3.5.1 single-layer application—direct attachment**

Space suitable wood furring strips 16" o.c. and attach to masonry walls. Apply gypsum panels of maximum practical length with long dimension at right angles to furring strips. Fasten panels with $\frac{1}{4}$ " type W screws spaced 12" o.c. Apply foil-back panels with foil side against furring. Where there is a possibility of water penetration through exterior walls, install an asphalt felt strip between furring strips and wall.

3.5.2 single-layer application—resilient attachment

Position resilient channels horizontally and attach with 2" cut nails in mortar joints or brick, clay tile or concrete block or in field of lightweight aggregate block; $\frac{5}{8}$ " concrete stub nails or power-driven fasteners in monolithic concrete. Space fasteners 24" o.c. Position channels within 4" of floor and ceiling line and not more than 24" o.c.

Apply gypsum panels of maximum practical length with long dimension parallel to resilient channels. Fasten panels with 1" type S screws spaced 12" o.c. Center horizontal abutting edges over screw flange of channel. Apply foil-back panels with foil side against channels. Where there is a possibility of water penetration through exterior walls, install an asphalt felt strip between resilient channels and wall.

3.6 exterior ceilings and soffits

Apply USG Exterior Gypsum Ceiling Board (horizontally) (vertically) with end joints over supports and with $\frac{1}{16}$ " to $\frac{1}{8}$ " space between butted ends of boards. Use maximum practical lengths to minimize end joints. Fasten boards to supports with screws spaced 12" o.c. or nails spaced 8" o.c. Where specified, cover joints with wood battens securely fastened to framing. Finish joints, trim and fasteners with exterior joint system applied according to manufacturer's directions.

3.7 underlayment application

Plywood subfloor must be sound, securely attached to framing, free of surface irregularities, and cleared of foreign material. Install PYROROCK Sound Underlayment Board with long dimension perpendicular to joists. Locate all end joints over joists, staggered with adjacent end joints and with joints in subfloor. Fasten boards with $\frac{1}{4}$ " type W screws or 6d ring-shank nails spaced 16" o.c. along each joist and around board cutouts. Drive fasteners flush with or below board surface. Except for carpet and pad or wood parquet flooring, fill all joints, fastener dimples and minor surface defects with DURABOND 90 Joint Compound. Seal entire room perimeter and all penetrations of underlayment with min. $\frac{1}{4}$ " bead of USG Acoustical Sealant along board edge.

3.8 accessory application

a. Joint System—Finish all face panel joints and internal angles with a U.S.G. Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

b. Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with $\frac{1}{16}$ " rosin-coated staples 9" o.c. on both flanges along entire length of bead.

c. Metal Trim—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with screws or staples 12" o.c.

d. P-1 Vinyl Trim—Slip trim over gypsum panel edge with long flange behind panel. Install panel with trim firmly abutting surface.

e. Screws—Power-drive at least $\frac{3}{8}$ " from edges or ends of gypsum panels to provide uniform dimple $\frac{1}{32}$ " deep.

f. Control Joints—Break gypsum panels and resilient channels behind joint and back by double supports. Attach control joint to face layer with staples spaced 6" o.c. on both flanges along entire length of joint.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE, PERF-A-TAPE, DURABOND, DUR-A-BEAD, THERMAFIBER, TEXTONE, MASTICAL, FLO-FILL, PYROROCK.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

exterior finishes—masonry veneer, wood siding and shingles, stucco and composition siding. Triple-sealed with water-repellent paper on face, back and long edges, this fire-resistant gypsum board has untreated core but comes with ends coated with special waterproofing. Easily nailed to studs 16" o.c.; meets HUD(FHA) requirements for omission of let-in corner bracing when properly installed. Available .4" thick, 48" wide, 8 and 9-ft. lengths with square edges.

2. USG Trim Accessories

DUR-A-BEAD is an all-metal heavy gauge hot-dipped galvanized steel reinforcement for protecting external corners. It is nailed to framing through gypsum panels and concealed with U.S.G. joint compounds as a smooth, finished corner. Available in three flange widths: No. 101 1"x1"; No. 103 1 1/4"x1 1/4"; No. 104 1 1/8"x1 1/8".

No. 800 Corner Bead is a galvanized steel external corner reinforcement with 1 1/4" wide fine-mesh expanded flanges. Nailed or stapled to framing through panels; provides superior key for joint compounds and eliminates shadowing.

USG Control Joint No. 093 is used to relieve stresses of expansion and contraction across the joint in large ceiling and wall areas. Used from floor to ceiling in long partition runs, and from door header to ceiling. Made from roll-formed zinc with a tape-protected 1/4" opening 7/16" deep. Lengths: 8' and 10'. **Limitation:** where sound and/or fire ratings are prime considerations, an adequate seal must be provided behind the control joint.

USG Metal Trims provide protection and neat finished edges to gypsum panels at window and door jambs, at ceiling angles and at intersections where panels abut other materials. Easily installed by nailing through the channel and panels into the framing or jamb. Eliminate precision cutting and mitering; joints are simply butted together. Finished with U.S.G. joint compounds (except P-1, P-2, #400 and RP series). Made in following types and sizes:

#200 series—steel casing, includes No. 200-A U-shaped channel in 1/2" and 5/8" sizes; No. 200-B L-shaped angle edge trim without back flange to simplify application, in 1/2" and 5/8" sizes; No. 200-C L-shaped trim, requires slotted jamb for installation in most cases, open "V" edge of flange inserts into 1/8" kerf to make trim adjustable for use with 3/8", 1/2" and 5/8" gypsum panels.

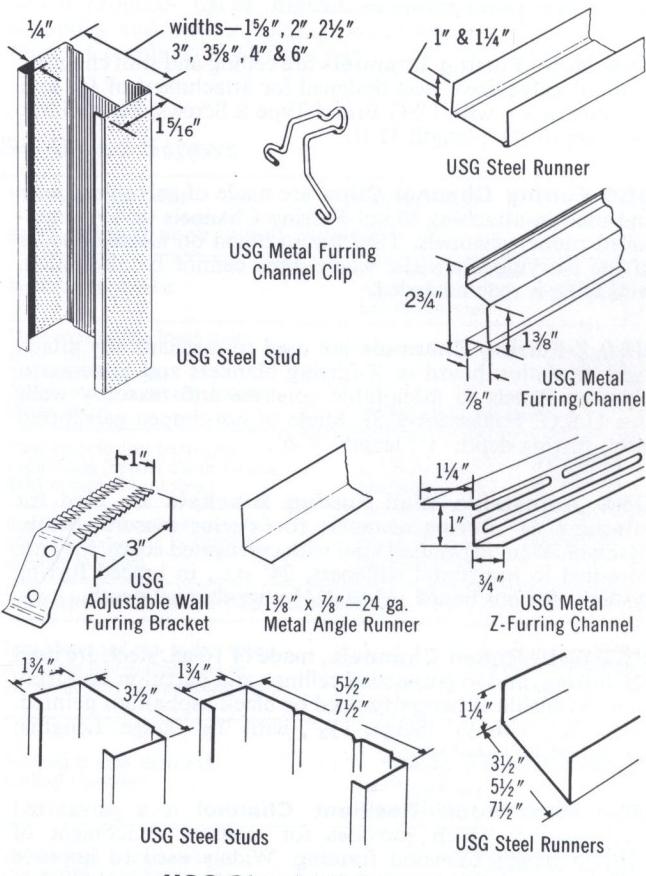
#400 series—reveal type all-metal trim, requires no finishing compound, includes No. 400 in 3/8" size, No. 401 in 1/2" size, No. 402 in 5/8" size.

#800 series—all-metal trim with expanded flanges used to provide edge protection at cased openings and ceilings or wall intersections. Includes 801-A channel-type and 801-B L-shaped trim, both in 1/2" and 5/8" sizes.

USG P-1 Vinyl Trim is a reveal type, white plastic trim with flanges and web of rigid vinyl and integral flexible vinyl fins that compress on installation. Fins form permanent flexible seal to effectively block sound, replace caulking, provide structural stress relief at panel perimeter. Fits tightly over panel edge; requires no finishing compound; paints easily; includes P-1A in 1/2" size, P-1B in 5/8" size.

USG P-2 Vinyl Trim is a channel-shaped vinyl trim with a pressure-sensitive adhesive backing for attachment to the wall at wall-ceiling intersections. Provides positive perimeter relief in radiant heat ceiling systems. Length: 10 ft.

USG Rigid Vinyl Trim (RP Series) is precision-made of rigid vinyl plastic in solid colors: ivory, tan, chocolate and black. Available for 3/8", 1/2" and 5/8" thick panels; lengths: 8', 9', 10'; shapes: RP-1 Outside Corner, RP-2 Inside Corner, RP-3 Divider, RP-4 End Cap, RP-5 Snap-on Corner, RP-7 Snap-on Batten.



USG Structural Accessories

3. Structural Accessories

USG Steel Studs and Runners, channel-type and roll-formed from galvanized steel, are designed for screw attachment of 1/2" and 5/8" SHEETROCK Gypsum Panels and USG Gypsum Sheathing. They are strong, non-load bearing components of interior drywall partitions, ceilings and column fireproofing and as framing for exterior curtain wall systems. Limited chaseways for electrical plumbing services are provided by punchouts in the stud web. Assemblies using these studs are low in cost and offer excellent sound and fire-resistance characteristics. Available in various styles and widths to meet functional requirements outlined below:

Interior Partitions, Ceilings, Column Fireproofing—ST5 and ST10 stud styles in seven widths—1 1/8", 2", 2 1/2", 3", 3 1/8", 4", 6"—and lengths 8 to 16 ft. Runners come in stud widths, 12-ft. length. For structural properties, see U.S.G. Folder SA-923.

Exterior Curtain Wall—studs are available to meet various height requirements and in nine widths—2", 2 1/2", 3", 3 1/2", 3 1/8", 4", 5 1/2", 6", 7 1/2"—lengths up to 28 ft. Runners come in stud widths (with 1 1/4" unhemmed leg), 10-ft. lengths. See

U.S.G. Folder SA-805 for stud styles, structural and physical properties and limiting heights.

Studs and Runners Style ST5 comply with ASTM C645; materials for Style ST10 comply with Fed. Spec. QQS-698 and QQS-775d, Class d.

USG Metal Angle Runners are $1\frac{3}{8}'' \times \frac{7}{8}'' \times 24\text{-ga}$. galvanized steel angle sections used to secure and brace 1" coreboard in laminated gypsum partitions. Length: 10 ft.

USG Metal Furring Channels are ceiling and wall channels made of galvanized steel designed for attachment of $\frac{1}{2}''$ and $\frac{5}{8}''$ SHEETROCK with USG Brand Type S Screws. Face width: $1\frac{3}{8}''$; depth: $\frac{7}{8}''$; length 12 ft.

USG Furring Channel Clips are made of galvanized wire and used in attaching Metal Furring Channels to $1\frac{1}{2}''$ cold-rolled runner channels. They are installed on alternate sides of the carrying channels; where clips cannot be alternated, wire tying is recommended.

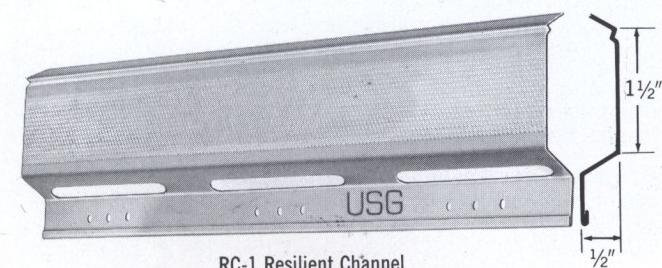
USG Z-Furring Channels are used to mechanically attach rigid insulation board or Z-furring blankets and SHEETROCK Gypsum Panels to monolithic concrete and masonry walls (see U.S.G. Folder SA-923). Made of hot-dipped galvanized steel; furring depth: 1"; length: 8'-6".

USG Adjustable Wall Furring Brackets are used for attaching $\frac{3}{4}''$ furring channels to exterior masonry walls. Made of 20-ga. galvanized steel with corrugated edges, they are wire-tied to horizontal stiffeners, 24" o.c., in braced furring systems: fur out board $\frac{1}{4}''$ to $2\frac{1}{4}''$ plus channel depth.

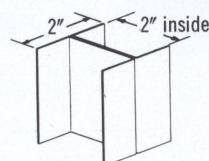
USG Cold-Rolled Channels, made of 16-ga. steel, are used for furring, and in suspended ceilings and partition construction. Available either galvanized or black asphaltum painted. Sizes: $\frac{3}{4}''$, with $\frac{1}{2}''$ flange; $1\frac{1}{2}''$, with $1\frac{1}{2}''$ flange. Lengths: 16 and 20 ft.

RC-1 SHEETROCK Resilient Channel is a galvanized steel channel which provides for resilient attachment of gypsum panels to wood framing. Widely used to improve sound transmission loss in partitions and ceilings of garden-type apartments, motels and other structures (see U.S.G. Construction Selector). Pre-punched holes in the flange facilitate screw fastening to framing members; SHEETROCK is attached to channel with USG Brand Type S Screws. Width: $2\frac{3}{8}''$; depth: $\frac{1}{2}''$; length: 12 ft. **Limitation:** not for use beneath highly flexible floor joists; should be attached to ceilings only with $1\frac{1}{4}''$ USG Brand Type W or S Screws; see Wood Framing Requirements, page 10.

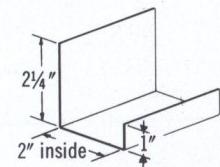
Note: Refer to Notes to Architect, page 10, for recommendations concerning use and storage of light-gauge metal components in Coastal and other areas where corrosive elements are present in the atmosphere.



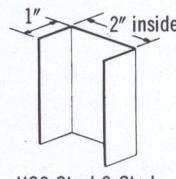
Steel Components for Shaft Walls and Area Separation Walls



USG Steel H-Stud

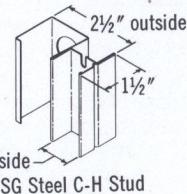


USG Steel J-Runner

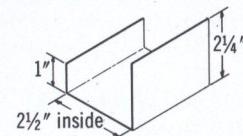


USG Steel C-Stud

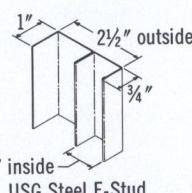
USG Solid Wall Systems



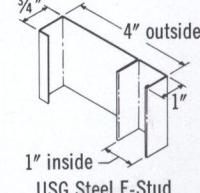
USG Steel C-H Stud



USG Steel J-Runner



USG Steel E-Stud



USG Steel E-Stud

USG Cavity Wall Systems

USG Steel Components for Shaft Walls and Area Separation Walls are formed from hot-dipped galvanized steel meeting ASTM A446-67, Grade A with $1\frac{1}{4}$ oz. per sq. ft. zinc coating (see U.S.G. Folders SA-922 and SA-924). Items are color-coded at factory to indicate style as follows: ST5 white; ST7 green; ST8 blue; ST10 red; ST13 yellow; ST16 black. Two groups:

Cavity Wall Components are made from galvanized steel for use with 1" thick USG Shaft Wall Liner. **USG Steel J-Runners** used as floor and ceiling runners and for elevator door framing are made with unequal legs in $2\frac{1}{2}''$ and 4" widths; styles: 212JR7, 400JR7; length: 10 ft. **USG Steel C-H Studs** are rigid roll-formed sections specially shaped to engage 1" liner panels. Widths: $2\frac{1}{2}''$ and 4", styles: 212CH5, 212CH8, 400CH5, 400CH10; lengths as required. **USG Steel E-Studs** are used singly to cap partition or both sides of closure panel; widths: $2\frac{1}{2}''$ and 4", styles: 212ES5, 212ES10, 400ESS, 400ES10; lengths as required.

Solid Wall Components are made for use with two thicknesses of 1" thick USG Shaft Wall Liner in Area Separation Walls. **USG Steel J-Runners** are used as floor and ceiling runners and back-to-back between liner panels at intermediate floors. Width: 2"; style: 200JR7; length: 10 ft. **USG Steel H-Studs** slide over and engage edges of adjacent liner panels. Width: 2"; styles: 200HS7, 200HS8, 200HS10, 200HS13, 200HS16; length: 8 to 16 ft. **USG Steel C-Studs** are used singly to cap partition or back-to-back both sides of closure panels. Width, styles and length same as for H-Studs.

4. USG Screws, Adhesives and Sealants

USG Brand Screws are aimed at producing the best possible attachment of SHEETROCK Gypsum Panels. Their development not only has improved installation methods but has made possible today's broad selection of drywall systems applied over steel framing. Screws must be used with such systems, with the exception of $\frac{3}{8}$ " panels applied to steel nailing channels, where annular ring nails may be used.

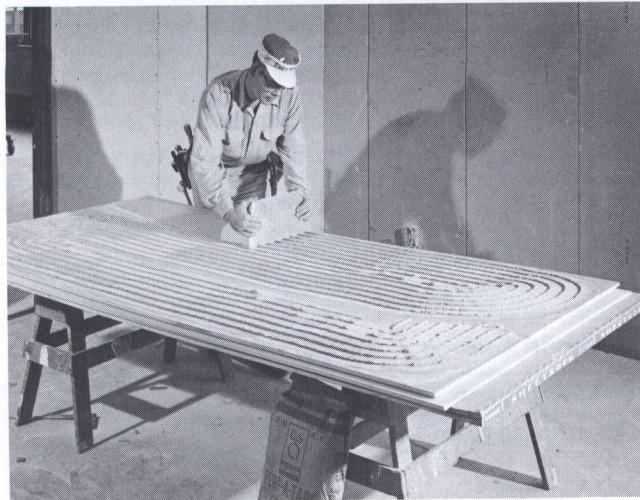
The superior holding power of drywall screws has virtually eliminated loose panel attachment and consequent problems

of "nail pops" in wood frame construction. Fewer screws than nails are generally required, and speed of installation compares favorably with nailing when electric screw guns are used. Fracturing of the gypsum core and damage to face paper are minimized. Tests have shown USG Brand Screws to have 100% greater withdrawal resistance than GWB-54 nails.

Today's complete U.S.G. line of 27 self-drilling, self-tapping steel screws includes types with a double lead thread design which produces up to 30% faster penetration, less screw stripping, and greater holding power than conventional fasteners. Comply with ASTM C646.

Selector Guide For USG Brand Screws

Fastening Application	Fastener Used	Fastening Application	Fastener Used
GYPSUM PANELS TO STEEL FRAMING (1)			
$\frac{1}{2}$ " single layer panels to steel studs, runners, channels	$\frac{7}{8}$ " Type S Bugle Head	Steel studs to runners	$\frac{3}{8}$ " Type S Pan Head Also available with hex washer head
$\frac{3}{8}$ " single layer panels to steel studs, runners, channels	1" Type S Bugle Head	Steel studs to door frame jamb anchor clips	
$\frac{1}{2}$ " double layer panels to steel studs, runners, channels	$1\frac{1}{16}$ " Type S Bugle Head	Steel studs to runner	
$\frac{3}{8}$ " double layer panels to steel studs, runners, channels	$1\frac{1}{8}$ " Type S Bugle Head	Other metal-to-metal attachment (12-ga. max.)	$\frac{3}{8}$ " Type S-12 Pan Head
1" coreboard to metal angle runners in solid partitions	$1\frac{1}{4}$ " Type S Bugle Head	Steel studs to door frame jamb anchor clips (heavier shank assures entry in clips of hard steel)	$\frac{1}{2}$ " Type S-12 Pan Head
$\frac{1}{2}$ " panels through coreboard to metal angle runners in solid partitions	$1\frac{1}{8}$ " Type S Bugle Head	Strut studs to door frame clips, rails, other attachments in ULTRAWALL movable partitions	$\frac{1}{2}$ " Type S-16 Pan Head Cadmium Plated
$\frac{3}{8}$ " panels through coreboard to metal angle runners in solid partitions	$2\frac{1}{4}$ " Type S Bugle Head	TRIM AND ACCESSORIES TO STEEL FRAMING	
GYPSUM PANELS TO 12-GA. (MAX.) STEEL FRAMING		Door hinges and trim to door frame Aluminum trim to steel framing (screw matches hardware and trim)	$\frac{3}{8}$ " Finishing Screw Type S-18 Oval Head Cadmium Plated
$\frac{1}{2}$ " and $\frac{3}{8}$ " panels and gypsum sheathing to steel studs and runners	1" Type S-12 Bugle Head	Cabinets to steel studs and resilient channels	$1\frac{1}{4}$ " Type S Oval Head Also available in $1\frac{1}{8}$ " and $2\frac{1}{4}$ " length
USG Self-Furring Metal Lath through gypsum sheathing to steel studs and runners	$1\frac{1}{4}$ " Type S-12 Bugle Head	Batten strips to steel studs in Demountable partitions	$1\frac{1}{8}$ " Type S Bugle Head
ULTRAWALL Panels to studs and runners	$1\frac{1}{4}$ " Type S-12 Bugle Head	Aluminum trim to interior steel framing in Demountable and ULTRAWALL partitions	$1\frac{1}{4}$ " Finishing Screw Type S Bugle Head Cadmium Plated
$\frac{1}{2}$ " and $\frac{3}{8}$ " double layer gypsum panels to steel studs and runners	$1\frac{1}{8}$ " Type S-12 Bugle Head	GYPSUM PANELS TO WOOD FRAMING	
Multi-layer gypsum panels to steel studs and runners Also available in $2\frac{3}{8}$ ", $2\frac{5}{8}$ " lengths	$1\frac{1}{8}$ " Type S-12 Bugle Head	$\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ " single layer panels to wood framing	$1\frac{1}{4}$ " Type W Bugle Head
WOOD TRIM TO INTERIOR STEEL FRAMING		RC-1 RESILIENT CHANNEL TO WOOD FRAMING	
Wood trim over single layer panels to steel studs, runners	$1\frac{1}{8}$ " Type S Trim Head	Screw attachment required for ceilings, recommended for partitions	$1\frac{1}{4}$ " Type W, $\frac{3}{8}$ " or 1" Type S Bugle Head (see details above)
Wood trim over double layer panels to steel studs, runners	$2\frac{1}{4}$ " Type S Trim Head	For fire-rated construction	$1\frac{1}{4}$ " Type S Bugle Head (see details at left)
GYPSUM PANELS TO GYPSUM PANELS		Notes: (1) Includes USG Steel Studs and Runners, Styles 5 through 10; Metal Angle Runners; Metal Furring Channels; RC-1 Resilient Channels. If channel resiliency makes screw penetration difficult, use screws $\frac{1}{8}$ " longer than shown to attach panels to RC-1 channels. For other styles of studs and runners, always use Type S-12 screws. For steel applications not shown, select a screw length which is at least $\frac{3}{8}$ " longer than total thickness of materials to be fastened. USG Brand Screws are manufactured under U.S. Patent Nos. 2,871,752; 3,056,234; 3,125,923; 3,207,023; 3,221,588; 3,204,442; 3,260,100.	



Spreader application of adhesive

USG Drywall Adhesives make an important contribution to gypsum panel attachment where the finest room interiors are desired. Their use greatly reduces the nail or screw fastening otherwise required, thus saves labor on spotting and sanding—also minimizes nail pops and other fastener imperfections.

Recommended for laminating gypsum panels in multi-layer fire-rated or non-rated partitions and ceilings are **DURABOND Joint Compounds**—dry powder products, applied by spreader, requiring mixing and temporary fastening in application. Provide tight bond when dry, yet permit adjustment of panels after contact.

In addition, ready-to-use **DURABOND Adhesives** are available in five types:

DURABOND 200 Adhesive—a solvent-base material, applied in $\frac{3}{8}$ " beads, for gypsum panel application to wood or metal framing. May be used with Foil-Back SHEETROCK Panels. Bridges minor framing irregularities; requires minimum field fasteners on ceilings; meets ASTM C557-73.

DURABOND 300 Adhesive—a water-base material, applied in beads, for gypsum panel application to wood framing. Bridges framing irregularities; requires a minimum of permanent fasteners in field of panels. May be used with Foil-Back SHEETROCK Panels; meets ASTM C557-73.

DURABOND 500 Adhesive—a water-base material, for application of prefinished wall paneling to existing wall surfaces. Also used for laminating gypsum panels and backing boards to monolithic concrete, concrete block and wood fiber sound deadening board in non-fire rated construction. Applied by spreader in strips at center and both edges of panel; strips consist of $\frac{1}{4} \times \frac{1}{4}$ " beads spaced 2" o.c. Allows board adjustment after erection; provides excellent bond after impacting. Field fasteners not required when panels are prebowed.

DURABOND 600 Adhesive—a water-base liquid contact adhesive for laminating gypsum panels in non-fire rated double layer systems. Roller applied, bonds tightly with impacting. Ceilings only require a minimum of permanent fasteners.

DURABOND Multi-Purpose Adhesive—a high-strength, waterproof, rubber-base material applied in beads, for installing plywood subflooring; plywood, hardboard, or gypsum wall panels; and other finish work. Bonds to most construction surfaces—wood, concrete, concrete block, galvanized steel and aluminum. Meets ASTM C557-73 and American Plywood Assn. Specification AFG-01.

DURABOND Adhesive Selector Chart

applied surface →	SHEETROCK Panels			TEXTONE Panels
base surface	Reg.	Foil-Back	W/R	
SHEETROCK Gypsum Panels	600†			600
SHEETROCK W/R Gypsum Panels				600
Foil-Back Gypsum Panels	600†			600
Gypsum Coreboard	500			500
Sound Deadening Board (wood & min. fiber)	500			500
Wood Studs, Joists and Furring	200 or 300	200	200 or 300	200 or 300
Painted Surfaces (clean, smooth, sound)	500			500
Unit Masonry (brick, stone, concrete block)	500		500	500
PYROBAR Gypsum Tile	500			500
Steel Studs and Channels	200	200	200	200

†For fire rating, use DURABOND Joint Compounds.

DURABOND Vinyl Foam Tape is used in conjunction with DURABOND 200, 300 and 500 Adhesives for application of gypsum panels to wood or metal framing, gypsum backing board, sealed plaster, monolithic concrete, and concrete block. Designed for temporary attachment of panels until adhesive attains ultimate strength. Double-faced with pressure-sensitive adhesive for contact bond.

USG Acoustical Sealant is a highly elastic, water-base caulking for sound-rated partition and ceiling systems. Non-bleeding and staining, pumpable and easily applied in beads. Provides excellent adherence to most surfaces, permanent flexibility and long-lasting seal.

Also available is **SHEETROCK Brand W/R Sealant**, applied to all cut edges and nail heads of special SHEETROCK Water-Resistant Panels used in high-moisture room areas to protect the gypsum core from moisture penetration.

For complete application specifications, see pertinent U.S.G. System Folders or adhesive application directions.

5. Joint Treatment Products

Today's complete U.S.G. joint treatment line includes both ready-to-use and powder-type compounds. In addition to conventional joint finishing and fastener spotting, certain of these products are designed for repairing cracks, patching, spackling, back-blocking, texturing and for laminating gypsum panels in double-layer systems.

Joint treatment products meet ASTM Standard C475 and Federal Specification SS-J-570A—Type I for joint compounds only, Type II for tape only, Type III for combined joint compound and tape.

general limitations

1. For interior use only; not intended for use on wood or wood fiber products (except in certain lamination applications—see DURABOND Joint Compound below).
2. Bagged and cartoned products require protection against wetting.
3. Each compound coat must be dry before next is applied, and completed joint treatment must be thoroughly dry before proceeding with decoration.

SHEETROCK Gypsum Panels & Accessories

PERF-A-TAPE Reinforcing Tape is a strong, cross-laminated fiber tape with minimal longitudinal stretch and superior tensile strength. Spark-perforated to allow air escape during embedding; lightly pre-creased for corner application. For estimating purposes: for 1,000 sq. ft. of surface area to be finished, approximately 370 lin. ft. of tape and 60 lbs. of powder-type or 6 gals. of ready-to-use type joint compound are required.

USG Brand Joint Compounds

This line of drying-type (non-casein) powder compounds possesses virtually all the desirable features of conventional casein-bound products, but in addition provides greater stability of wet mix consistency and savings in mixing time. Not compatible with casein-type compounds, but may be used over DURABOND and USG Ready-To-Use Compounds.

USG Joint Compound-Taping is designed for embedding tape and for first fill coat on metal beads, trim and fasteners; also used for patching plaster cracks. Outstanding bond and resistance to tape cracking.

USG Joint Compound-Topping is a smooth-sanding, low-shrinkage material for second and third coats over taping compound. Produces excellent feathering and superior finishing results.

USG Joint Compound-All Purpose incorporates good taping and topping characteristics in a single product, for use where finest results of the specialized compounds (above) are not necessary. Also has good texturing properties.

DURABOND Joint Compounds

These hardening-type powder products were developed to provide faster finishing of drywall interiors, even under slow drying conditions. Rapid chemical hardening and low shrinkage permit same-day finishing and usually next-day decoration. Low shrinkage and superior bond are outstanding features: ideal for laminating double-layer systems, particularly fire-rated assemblies. They are not compatible with casein-type compounds. **Limitation:** DURABOND Joint Compound-Taping and 90 are not to be used as finishing coat; must always be completely covered with final application of USG or Ready-To-Use Joint Compound-All Purpose or Topping, or DURABOND Joint Compound-All Purpose.

DURABOND Joint Compound-Taping is preferred for embedding tape and metal accessories; also ideal for heavy fills because it chemically hardens in 3 to 4 hours. Virtually unaffected by high humidity and changes in humidity.

DURABOND 90 Joint Compound is the required pre-fill material for SHEETROCK SW rounded-edge gypsum panels, creating the strongest joints ever developed. Its 1 to 2-hour

hardening time also makes it an ideal alternate to DURABOND Joint Compound-Taping in applications where quicker finishing is desired.

DURABOND Joint Compound-All Purpose is a versatile material that offers the convenience of a single-package product for taping, filling, patching and finishing. Once hardened, it may be immediately decorated with USG Texture I Paint or Spray Texture Finish.

DURABOND XL Joint Compound is a distinctively superior product designed to treat joints, fasteners, drywall beads and trims, and areas requiring heavy fills in USG Exterior Gypsum Ceiling Board application. Hardens in 30 to 60 minutes; offers outstanding properties of bond, moisture resistance, edge-crack resistance and low shrinkage.

Ready-To-Use Compounds

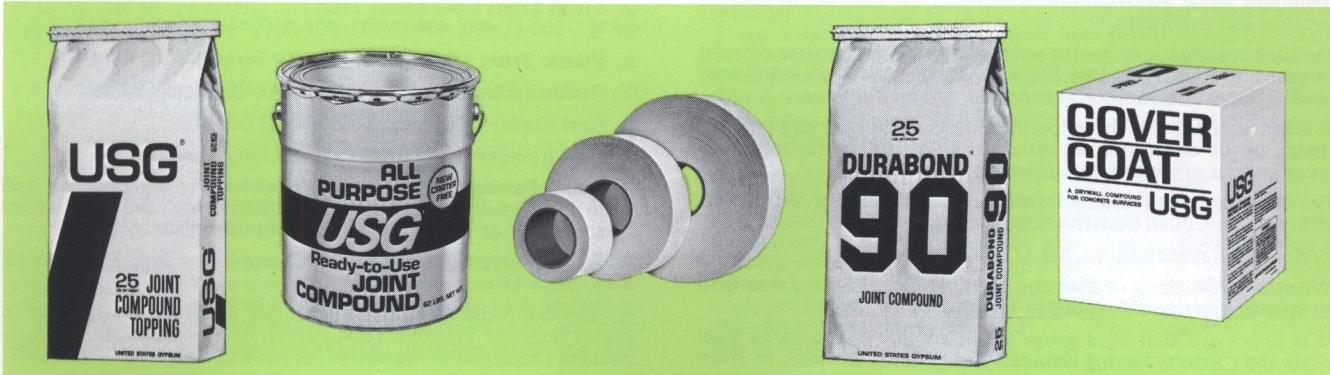
Exclusive with U.S.G., new Crater Free Ready-To-Use Joint Compounds are vastly superior to ordinary ready-mixed compounds and are preferred for consistently high-quality work. These vinyl-based formulations are specially pre-mixed to a creamy, smooth consistency essentially free of crater-causing air bubbles. They offer excellent slip and bond, easy workability. Used direct from the container without mixing, thinning or retempering. Available in either machine or hand tool consistency; on-the-wall cost averages the same as with powder compounds. **Limitations:** must protect wet joints and container from freezing; not recommended for laminating.

USG Crater Free Ready-To-Use Joint Compound-Taping is a high-performance product for embedding tape and as a first fill coat over metal bead, trim and fasteners.

USG Crater Free Ready-To-Use Joint Compound-Topping is a low-shrinkage, easily applied and sanded product recommended for second and third coats over USG Ready-To-Use Taping and All Purpose Compounds. Also used as first coat over metal corners, trim and fasteners. Excellent for texturing or skim coating. Not suitable for embedding tape.

USG Crater Free Ready-To-Use Joint Compound-All Purpose, used for embedding, finishing and texturing. Combines single-package convenience with good taping and topping characteristics. Recommended for finishing SHEETROCK SW Gypsum Panel joints over DURABOND 90 pre-fill coat and for finishing over DURABOND Taping Compound; also for repairing cracks in interior plaster and masonry not subject to moisture.

COVER COAT Compound is a vinyl-base product, designed for filling and smoothing monolithic concrete ceilings and columns located above grade—no extra bonding agent needed. Supplied in ready-mixed form (sand can be added), easily applied with drywall tools in two or more coats. Dries to a fine white surface usually making further decoration



unnecessary on ceilings. **Limitations:** not to be applied over moist surfaces or surfaces likely to become moist (by condensation or otherwise), on ceiling areas below grade, on surfaces which project outside the building, or on other areas which might be subject to moisture, freezing, efflorescence, pitting or popping.

Radiant Heat Filler

SHEETROCK R. H. Filler is a high-density, specially formulated product for embedding electric cables in radiant heated ceilings. Provides more efficient heat transmission and greater resistance to heat deterioration. Hand-applied to embed cables to a total thickness of $\frac{1}{4}$ ". Used over special USG R. H. Base attached to wood joists (see U.S.G. Bulletin P-480), to metal furring channels or suspended grillage, or over a bonding agent directly to monolithic concrete ceilings. UL listed.

Wood Framing Requirements: wood framing meeting the following minimum requirements is necessary for proper performance of all gypsum drywall fasteners.

1. Framework shall meet the minimum requirements of HUD and local building codes.
2. Framing members shall be straight, true, of uniform dimension, and framing shall be properly aligned.
3. All framing lumber shall be of a good grade for the intended use, and 2" x 4" nominal size or larger shall bear the grade mark of a recognized inspection agency using grading rules for lumber recommended to American Lumber Standards Committee.
4. All framing lumber shall have a moisture content not in excess of 15% at time of gypsum panel applications.
5. Do not attach gypsum panels to extremely soft framing members.

Failure to observe these minimum framing requirements, which are applicable to screw, nail and adhesive attachment, will materially increase the possibility of ineffective fastening concealment, due to warping or dimensional changes. This is particularly true if framing lumber has greater than normal tendencies to warp or shrink after erection.

Heating and Ventilation Recommendations: framing should approach as closely as possible the moisture content it will reach in service by allowing the building, after it is enclosed, to stand as long as possible prior to the application of the gypsum panels. Provide heat in winter or during damp conditions at a uniform temperature in the range of 50° to 70°F. Provide ventilation to remove excess moisture.

general drywall specifications

notes to architect

The following comments and recommendations cover the basic specifications for normal job requirements, and are intended as minimum guide specifications which can be adapted to specific projects and conditions.

Detailed specifications on the various drywall systems are covered in pertinent U.S.G. System Folders. Other related job conditions should be covered in the plans, details, or specifications.

It is not intended that these specifications shall cover every possible design or job condition, but rather to assist in the preparation of specifications applicable to a given project.

For fire ratings and sound transmission loss data of various assemblies, see U.S.G. Construction Selector.

For painting specifications, see U.S.G. Folder SA-933.

When Back-Blocking or Floating Interior Angle construction is to be specified, see specifications in U.S.G. Folder SA-924.

It is important that light-gauge metal components such as steel studs and runners, furring channels and resilient channels be given

adequate protection in the warehouse or on the jobsite against rusting caused by moisture. In marine areas such as the Caribbean, Florida and the Gulf Coast where chloride as well as sea salt is present in combination with excessively high humidity, it is recommended that components be used which offer increased protection against corrosion.

Temperature differentials in an exterior wall may cause interior condensation which when combined with airborne dust could result in photographing or shadowing over fasteners and furring. Because soiling and temperature differences are variables over which it has no control, United States Gypsum cannot be held responsible for surface blemishes that result. Where temperature, humidity and soiling conditions are expected to cause objectionable blemishes, free-standing furring is recommended.

The only drywall product recommended for the embedment of electric heat cables is SHEETROCK R.H. Filler backed by USG R.H. Base or applied directly to monolithic concrete. See description at left, and U.S.G. Bulletin P-480.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. **Gypsum Panels** (in lengths as long as practical to minimize number of joints):

(SHEETROCK SW, Regular, FIRECODE, FIRECODE "C", Foil-Back) Gypsum Panels (thickness).

(TEXTONE Vinyl Panels) (type) (color or pattern).

(SHEETROCK W/R Gypsum Panels) (type) (thickness).

b. **Gypsum Coreboard:** USG Coreboard (length).

c. **Gypsum Sheathing:** (USG Gypsum Sheathing, USG Triple-Sealed Gypsum Sheathing) (size).

d. **Exterior Ceiling Board:** USG Exterior Gypsum Ceiling Board.

e. **PYROROCK Sound Underlayment Board:** (length).

f. **Corner Reinforcement:** (DUR-A-BEAD No. 101, 103, 104) (No. 800).

g. **Metal Trim:** USG Metal Trim No. (200-A $\frac{1}{2}$ " or $\frac{5}{8}$ ", 200-B $\frac{1}{2}$ " or $\frac{5}{8}$ ", 200-C, 400, 401 or 402, 801-A $\frac{1}{2}$ " or $\frac{5}{8}$ ", 801-B $\frac{1}{2}$ " or $\frac{5}{8}$ ").

h. **Plastic Trim:** USG (P-1) (P-2) (RP Series), Vinyl Trim.

i. **Resilient Channels:** RC-1 SHEETROCK Resilient Channel.

j. **Steel Studs:** USG Steel Studs (style) (length).

k. **Steel Runners:** USG Steel Runners (style) (length).

l. **Metal Furring Materials:** (USG Metal Furring Channels and Clips) (USG Adjustable Wall Furring Brackets) (USG Cold-Rolled Channels $\frac{3}{4}$ " or $1\frac{1}{2}$ ") (USG Z-Furring Channels).

m. **Drywall Screws:** (length) (USG Brand Screw Type S, S-12, S-16, S-18, W or G).

n. **Drywall Nails:** (length) (type) (USG Matching Color Nails to match finish of TEXTONE Vinyl Panels) (conforming with "Recommended Performance Standards for Nails for Gypsum Wallboard",

adopted by the Gypsum Association and the Gypsum Drywall Contractors International) (as specified in fire-resistive construction).

o. Control Joints: USG Control Joint No. 093.

p. Drywall Adhesives: (DURABOND Joint Compound-Taping, 90 or All Purpose) (DURABOND 200, 300, 500, 600, Multi-Purpose Adhesive) (DURABOND Vinyl Foam Tape).

q. W/R Sealant: (for SHEETROCK W/R Gypsum Panels) SHEETROCK Brand W/R Sealant.

r. Joint Treatment: PER-A-TAPE Reinforcing Tape.

DURABOND Joint Compound-(Taping, 90, All Purpose, XL).

USG Joint Compound-(Taping, Topping, All Purpose).

USG Crater Free Ready-To-Use Joint Compound-(Taping, Topping, All Purpose).

s. Caulking: USG Acoustical Sealant.

t. Concrete Finishing Compound: COVER COAT Drywall Compound (as ready-mixed) (with sand additive).

u. Cavity Shaft Wall Materials: USG Shaft Wall Liner, USG Steel J-Runners (style), USG Steel C-H Studs (style), USG Steel E-Studs (style).

v. Cavity-type Area Separation Wall Materials: USG Gypsum Liner Panels, USG Steel J-Runners (style), USG Steel C-H Studs and E-Studs (style).

w. Solid-type Area Separation Wall Materials: USG Gypsum Liner Panels, USG Steel J-Runners (style), USG Steel H-Studs and C-Studs (style).

Part 3: execution

3.1 gypsum panel application

3.1.1 basic single-layer system, treated joints

a. Position all ends and edges of all gypsum panels over nailing members, except when joints are at right angles for framing members as in horizontal application or when end joints are backblocked.

b. Apply SHEETROCK Panels first to the ceiling and then to the walls. Extend ceiling board into corners and make firm contact with top plate. To minimize end joints, use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.

c. Attach panels to framing supports by: (Standard Single Nailing Method) (Adhesive—Nail-On Method) (Double Nailing Method) (Power-driven USG Brand Screws). Space fasteners not less than $\frac{3}{8}$ " from edges and ends of panels and drive as recommended for specified fastening method. Drive fasteners in field of panels first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.

d. Cut ends, edges, scribe or make cutouts within field of panels in a workmanlike manner.

e. Install trim at all internal and external angles formed by the intersection of either gypsum panel surfaces or other surfaces. Apply corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions:

(Multi-layer systems: see pertinent U.S.G. System Folders.)

3.1.2 SHEETROCK W/R Gypsum Panels—(see U.S.G. Folder SA-924).

3.1.3 lamination of SHEETROCK Gypsum Panels to interior monolithic concrete and unit masonry

a. The masonry or concrete shall be clean, smooth and dry prior to application. For PYROBAR Tile partitions, mix wall size as prescribed by manufacturer, apply in one coat over entire surface, and allow to dry at least 24 hours. If wood base is to be used, attach wood nailer to wall before lamination is started.

b. Cut face panels to allow continuous clearance ($\frac{1}{8}$ " to $\frac{1}{4}$ ") at floor. Apply DURABOND 500 Adhesive at center and near each panel edge in strips consisting of 4 beads, $\frac{1}{4}$ " wide x $\frac{1}{4}$ " high and spaced 2" o.c. Position panels vertically over wall surface, press into place and impact over entire surface 16" o.c., including edges and ends.

c. Install trim at all intersections of panel surfaces with other surfaces.

d. Lamination to interiors below grade or directly to interior surfaces of exterior walls, and lamination where exposure to moisture is extreme or continuous, are not recommended construction.

3.2 RC-1 Resilient Channel erection

(See specifications in U.S.G. Folder SA-924.)

3.3 steel stud and runner erection

(See specifications in U.S.G. Folder SA-923.)

3.4 metal furring channel erection

(See specifications in U.S.G. Folder SA-923.)

3.5 control joint installation

Attach USG Control Joint No. 093 with Bostitch $\frac{1}{16}$ " "G" staples or equal spaced not over 6" apart in each flange. Cut end joints square and align for neat fit. Remove protective tape when joint treatment is completed.

3.6 fastener and adhesive application

3.6.1 USG Brand Screws

Power-drive with an electric screwdriver so screw heads provide a slight depression below surface of gypsum panels without breaking face paper. Do not drive screws closer than $\frac{3}{8}$ " from edges and ends of board.

3.6.2 nails

Drive nails with heads slightly below gypsum panel surface in a dimple formed by crowned face of hammer. Drive nails no closer than $\frac{3}{8}$ " from edges and ends of panel.

3.6.3 adhesive

Mix and apply in accordance with manufacturer's directions, and as follows:

a. Apply DURABOND Joint Compound-Taping, 90 or All Purpose in the prescribed manner to back of face panels to be laminated. Laminate face panels to (base layer panels) (coreboard) using moderate pressure and temporary nailing or shoring to insure adequate bond.

b. Apply DURABOND (200) (300) Adhesive in a continuous $\frac{3}{8}$ " bead at center of attachment to face of framing members. Where two gypsum panels meet on a framing member, apply a serpentine or zigzag bead with an 8" repeat pattern permitting adhesive to contact each panel edge. For predecorated panels, apply two parallel beads on face of framing at panel joints. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following contact of panel to adhesive, apply necessary fasteners 16" o.c. around perimeter of panel, $\frac{3}{8}$ " away from edges and ends. On ceilings only, apply one temporary field fastener per framing member at mid-width of board; remove after 24 hours. With predecorated panels pre-bowed and applied vertically, use permanent fasteners only at top and bottom of panel.

c. Apply DURABOND 500 Adhesive in strips to center and along both edges of gypsum face panel. Apply strips with a notched metal spreader having four $\frac{1}{4}$ " x $\frac{1}{4}$ " minimum notches spaced max. of 2" o.c. Position face panels against base panels; fasten at top and bottom (vertical application) as required. For laminated ceilings, space fasteners 16" o.c. along edges and ends, with one permanent field fastener per framing member installed at mid-width of panel. Press panel into place with firm pressure to insure bond; reimpact within 24 hrs. if necessary.

d. Apply DURABOND 600 Adhesive with a short nap paint roller to cover both contact surfaces. Let adhesive air dry to the touch; about 30 minutes depending on temperature and humidity, until color turns from light blue to darker blue. Apply panels as soon as possible after drying occurs. On walls, fasten 16" o.c. at top and bottom (vertical application) as required. In ceiling lamination, apply permanent supplementary fasteners at each corner of sheet, and along edges spaced max. 48" o.c. Press panel into place with firm pressure to insure bond.

e. Apply DURABOND Multi-Purpose Adhesive in continuous $\frac{3}{8}$ " beads to framing. On floors, install plywood panels across joists with $\frac{1}{8}$ " gap between panels and end joints staggered. Where panel ends butt, apply two beads so each panel is bonded. Within 15 min. after applying adhesive, position panels and nail to supports with 6d annular ring or 8d common nails spaced 12" o.c. Apply adhesive to long edge of installed panels to bond next row of panels.

On walls, apply a continuous $\frac{3}{8}$ " bead to center of studs to within 6" of board perimeter. At panel joints, apply two adhesive beads—one at a time—as each panel is installed. Do not apply adhesive at inside corners or to top and bottom plates, bridging, bracing and fire stops. Apply no more adhesive than can be covered in 15 min. Set panel in place, fasten 16" o.c. along top and bottom of panel and impact by hand along each stud.

3.7 pre-fill application

- a. Mix DURABOND 90 Joint Compound according to directions on bag. Do not overmix, or use extremely cold water or cold joint compound.
- b. Pre-fill all "V"-grooves formed by abutting eased edges of SHEETROCK SW Gypsum Panels with DURABOND 90 Joint Compound using a flexible 5" or 6" joint finishing knife or Ames Pre-Fill Tool. Fill "V" joint flush and wipe off excess compound beyond the "V" groove, leaving a clear depression to receive tape. Allow pre-fill to harden prior to the next application (tape or embedding coat).

3.8 joint treatment application

- a. Mix joint compound in strict accordance with manufacturer's recommendations.
- b. Apply taping or embedding compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply PERF-A-TAPE Reinforcing Tape centered over joint and seated into compound. Sufficient compound—approx. $\frac{1}{6}$ " to $\frac{1}{2}$ "—must remain under the tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape or embedding coat must be thoroughly dry prior to application of second coat. (Exception: DURABOND Joint Compounds need only have hardened prior to application of next coat.)
- c. Apply second coat of joint compound over embedding coat, filling panel taper flush with surface; cover tape and feather out slightly beyond first coat. On joints with no taper, cover the tape and feather out at least 4" on either side of tape. Allow second coat to dry thoroughly prior to application of finish coat. (Exception: DURABOND Joint Compounds need only have hardened prior to second coat application.)
- d. Spread finish coat evenly over and extend slightly beyond second coat on all joints and feather to a smooth uniform finish. Over tapered edges, do not allow finished joint to protrude beyond plane of the surface. Apply a finish coat to cover tape and taping compound at all tapered angles and provide a true angle. Where necessary, sand between coats and following the final application of compound to provide a smooth surface ready for decoration.

3.9 finishing fasteners

Apply a taping or all-purpose type compound to fastener depressions as the first coat. Follow with a minimum of two additional

coats of topping or all-purpose compound, leaving all depressions level with the plane of the surface. Use DURABOND Joint Compound Taping and 90 only for the first coat on fasteners.

3.10 finishing beads and trims

- a. Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must be thoroughly dry prior to application of second coat. (Exception: DURABOND Joint Compounds need only have hardened prior to application of next coat.)

b. Apply second coat in same manner as first coat, extending compound slightly beyond onto face of panel. Compound must be thoroughly dry prior to application of finish coat.

c. Apply finish coat to all bead and trim, extending compound slightly beyond the second coat and properly feathering from ground to plane of surface. Sand finish coat as necessary to provide a flat smooth surface ready for decoration.

3.11 exterior joint system application

- a. Mix DURABOND XL Joint Compound according to directions on the bag. Do not overmix, nor use in temperatures below 45°F.
- b. Pre-fill joints of USG Exterior Gypsum Ceiling Board with DURABOND XL Compound. After pre-fill has hardened, embed PERF-A-TAPE Reinforcing Tape centered over joint. When compound has hardened, immediately apply fill coat of DURABOND XL.
- c. Apply DURABOND XL Compound over flanges of USG Control Joints, metal beads and trim. Spot fastener heads.
- d. After fill coat has hardened, apply finishing coat of DURABOND XL Compound. Completely cover all joints, angles, beads, control joints and fasteners.

Note: After DURABOND XL has dried, apply one coat oil-based primer-sealer and one coat exterior oil or latex paint.

3.12 COVER COAT Compound application

- a. Concrete surfaces shall be clean, smooth, dry and free from contaminants and exposed metal protected with a rust-preventative paint and allowed to dry.
- b. Mix COVER COAT Compound according to manufacturer's directions and apply to concrete (ceiling) (columns) before interior partitions are erected. Coordinate application of USG No. 800 Corner Bead on angles and corners as required, embedding and covering both flanges with a smooth fill of COVER COAT Compound 3" to 4" wide. Sand surface of each coat after it has dried at least 24 hours. Apply sufficient coats to obtain smooth surface suitable for (texturing) (decoration).

3.13 SHEETROCK R.H. Filler application

- a. Chisel or grind monolithic concrete surfaces as necessary to remove ridges. Coat exposed metal with a rust-preventative paint and allow to dry. Apply a liquid bonding agent to concrete according to manufacturer's directions.
- b. Apply SHEETROCK R. H. Filler to the depth of the cables, then double back with a $\frac{1}{8}$ " coat to a $\frac{1}{4}$ " total thickness. Smooth finished surface to receive decoration.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, DURABOND, FIRECODE, TEXTONE, THERMAFIBER, DUR-A-BEAD, ULTRAWALL, PERF-A-TAPE, PYROBAR, COVER COAT, PYROROCK.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

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description and utility

There is only one SHEETROCK—the interior wall and ceiling surface developed and improved by United States Gypsum. It is the product that in the last quarter-century, has revolutionized construction—to the point that today more than 90% of all new residential buildings are finished with gypsum panels. Systems using SHEETROCK Gypsum Panels now have gained the same acceptance in commercial building.

SHEETROCK is a mill-fabricated gypsum panel composed of a fireproof gypsum core encased in a heavy manila-finished paper on the face side and a strong liner paper on the back side. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square-cut and finished smooth. In SHEETROCK SW Gypsum Panels, an exclusive edge design strengthens the joint and reduces imperfections in finishing.

Gypsum panels are produced in specialized forms for various applications. Complementing these is the industry's broadest line of accessories, adhesives and joint treatment materials to provide complete partition, ceiling and floor assemblies. This catalog covers these products in five groups: (1) Gypsum Panel Products; (2) Trim Accessories; (3) Structural Accessories; (4) Screws and Adhesives; (5) Joint Treatment Products. A general specification appears on pages 10 to 12; performance and specification of assemblies using these components are covered in pertinent U.S.G. System Folders.

Interior walls and ceilings built with SHEETROCK gain a durable surface suitable for any type of decorative treatment and for repeated decoration during the life of the building. The joints between adjacent panels may be reinforced and concealed with a U.S.G. joint treatment system, or may be featured by leaving exposed or covering with a decorative molding.

Dry Construction—mill-fabricated gypsum panels eliminate excessive moisture in construction.

Speed—Panels are easily cut and quickly applied.

Quick Decoration—essentially a "dry" material, SHEETROCK Panels permit painting or other decoration, and the installation of metal or wood trim, almost immediately.

Fire Protection—the gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F. until completely calcined—a slow process. See U.S.G. Construction Selector SA-100 for fire-resistance ratings.

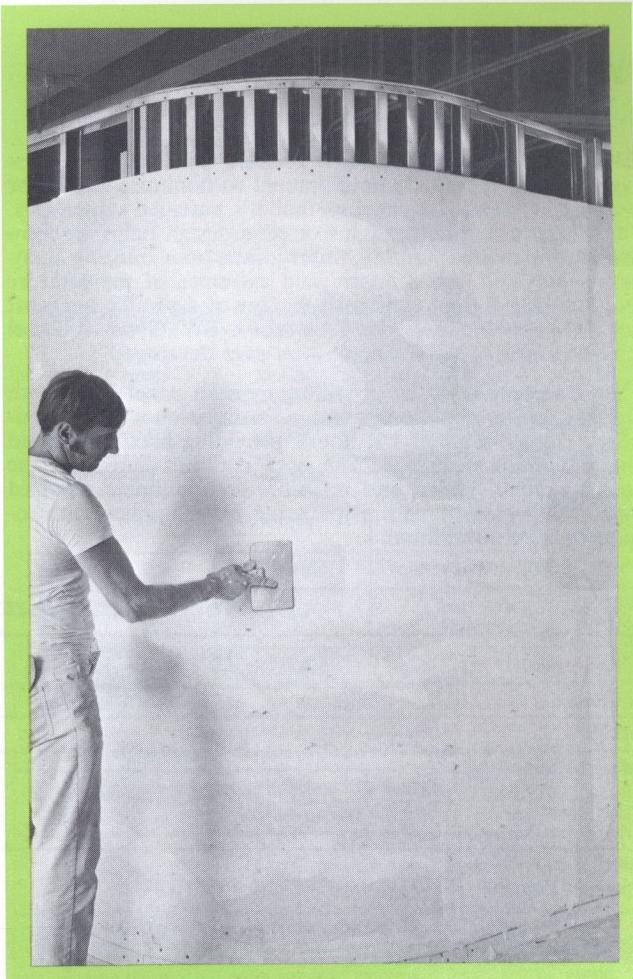
Crack Resistance—with joints reinforced by one of the U.S.G. joint systems, SHEETROCK SW Gypsum Panels form walls and ceilings exceptionally resistant to cracks caused by frame movement, vibration or minor settlement.

Non-Warping—expansion or contraction under normal atmospheric changes is negligible and does not cause harmful warping or buckling.

Availability—24 strategically located U.S.G. operating plants produce and/or stock the gypsum panel materials described here. Special distribution centers, in addition to these plants, increase total service efficiency to major markets and rural areas from coast to coast. All standard or specialty gypsum panel products may be considered readily available and easily procured upon short notice.

general limitations

1. Not recommended where exposure to moisture is extreme or continuous.
2. Must be adequately protected against wetting when used as a base for ceramic or other wall tile (see Foil-Back SHEETROCK limitation). SHEETROCK W/R Gypsum Panels are the recommended product for this purpose in partitions.



3. Maximum spacing of framing members: $\frac{1}{2}$ " and $\frac{5}{8}$ " SHEETROCK Gypsum Panels are designed for use on framing centers from 16" to 24"; $\frac{3}{8}$ " and $\frac{1}{4}$ " SHEETROCK, on centers up to 16". In both walls and ceilings, when $\frac{1}{2}$ " or $\frac{5}{8}$ " SHEETROCK Panels are applied across framing on 24" centers and joints reinforced, headers are not required. $\frac{3}{8}$ " and $\frac{1}{4}$ " SHEETROCK not recommended for use on metal framing nor as base for spray-applied texture finish. For this finish, $\frac{1}{2}$ " or $\frac{5}{8}$ " SHEETROCK Panels are applied across framing.

4. Application of SHEETROCK over $\frac{3}{4}$ " wood furring applied across framing is not recommended since the relative flexibility of the furring under impact of the hammer tends to loosen nails already driven. Furring should be 2" x 2" minimum (may be nom. 1" x 4" if panels are to be screw-attached).

5. The application of SHEETROCK over an insulating blanket, that has first been installed continuously across the face of the framing members, is not recommended. Blankets should be recessed and the blanket flanges attached to sides of studs or joists.

technical data

SHEETROCK Gypsum Panels comply with Federal Specification SS-L-30D; ASTM C36. Thermal coefficient of expansion (unrestrained): 9.0×10^{-6} in. per in. per deg. F. (40° — 100° F); hygrometric coefficient of expansion (unrestrained): 5.4×10^{-6} in. per in. per % r.h. (5%—90% r.h.). Fire hazard classification: flame spread 15, fuel contributed 15, smoke developed 0.

types and functions

1. Gypsum Panel Products

SHEETROCK SW Gypsum Panels are United States Gypsum's revolutionary development to minimize ridging or beading at joints—so effective that it's patented under U.S. Pat. No. 3,435,582. Its exclusive edge design helps to compensate for twisted framing, offset joints, poor framing alignment, damaged board edges, and extremes of temperature and humidity during construction. One of drywall's foremost advances in 40 years, the SHEETROCK SW Gypsum Panel system produces the strongest joint ever developed.

This is accomplished by pre-filling gypsum panel joints with DURABOND 90 Joint Compound, a formulation which chemically hardens in about 1½ hours, providing maximum bond and minimum shrinkage. The edge contour eliminates the need to crown joints, and no more compound is required than with regular panels. Taping and other application procedures are conventional.

SHEETROCK Regular Gypsum Panels have a tapered edge, but otherwise are identical to SW Panels. Both types are made in three thicknesses:

— $\frac{5}{8}$ ", recommended for the finest single layer drywall construction. The greater thickness provides increased resistance to fire exposure and transmission of sound.

— $\frac{1}{2}$ ", for single layer application in residential construction.

— $\frac{3}{8}$ ", lightweight, applied principally in the double wall system over wood framing and in repair and remodel work.

Regular Panels are available in one additional thickness:

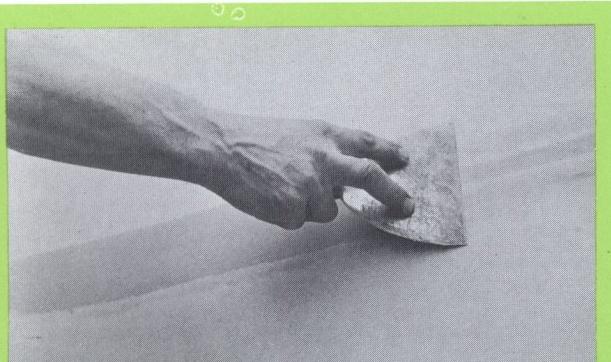
— $\frac{1}{4}$ ", a lightweight, low-cost, utility gypsum panel, used as base layer for improving sound control in double-layer metal and wood stud partitions and for use over old wall and ceiling surfaces.

Width: 4'; length: 8', 9', 10', 12' or 14' (except $\frac{1}{4}$ ", available in 8' and 10' lengths only); edges: SW or tapered; finish: ivory manila paper, suitable for paint or other decoration.

Where to use SHEETROCK Gypsum Panels

	(type)→	Reg- ular	SW and Regular		FIRECODE		Foil-Back			R.H. Base	TEXTONE Vinyl Panels	W/R Panels†
construction	(thickness)→	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ " & $\frac{5}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{1}{2}" & \frac{5}{8}"$	$\frac{3}{8}"$, $\frac{1}{2}"$ or $\frac{5}{8}"$	$\frac{1}{2}" & \frac{5}{8}"$
WALLS												
Exterior Walls—Single Layer				X	X	X		X	X			X
masonry (furred)				X	X	X		X	X			X
wood framing				X	X	X		X	X			X
rigid insulation board				X	X	X		X	X			X
Exterior Walls—Double Layer				X	X	X	X	X	X		X	
masonry (furred)				X	X	X	X	X	X		X	
base				X	X	X	X	X	X		X	
finish				X	X	X	X	X	X		X	
wood framing				X	X	X	X	X	X		X	
base				X	X	X	X	X	X		X	
finish				X	X	X	X	X	X		X	
Interior Walls—Single Layer				X	X	X	X	X	X		X	
over existing walls				X	X	X	X	X	X		X	
masonry (furred)				X	X	X	X	X	X		X	
wood framing				X	X	X	X	X	X		X	
metal framing				X	X	X	X	X	X		X	
masonry & concrete (direct)				X	X	X	X	X	X		X	
Interior Walls—Double Layer				X	X	X	X	X	X		X	
masonry (furred)				X	X	X	X	X	X		X	
base				X	X	X	X	X	X		X	
finish				X	X	X	X	X	X		X	
wood framing				X	X	X	X	X	X		X	
base				X	X	X	X	X	X		X	
finish				X	X	X	X	X	X		X	
metal framing				X	X	X	X	X	X		X	
base				X	X	X	X	X	X		X	
finish				X	X	X	X	X	X		X	
CEILINGS												
Ceilings—Single Layer		X	X	X	X	X	X	X	X	X	X	
over existing ceiling		X	X	X	X	X	X	X	X	X	X	
wood framing		X	X	X	X	X	X	X	X	X	X	
metal framing		X	X	X	X	X	X	X	X	X	X	
Ceilings—Double Layer				X	X	X	X	X	X			
wood framing				X	X	X	X	X	X			
base				X	X	X	X	X	X			
finish				X	X	X	X	X	X			
metal framing				X	X	X	X	X	X			
base				X	X	X	X	X	X			
finish				X	X	X	X	X	X			
Ceilings—Acoustical Base				X	X	X						
over suspended metal grillage				X	X	X						
over channel or nailable steel studs				X	X	X						

†Recommended as a base for ceramic or other tile.



Pre-filling joints of SHEETROCK SW Gypsum Panels

SHEETROCK FIRECODE Gypsum Panels, made in $\frac{3}{8}$ " and $\frac{1}{2}$ " thicknesses, combine all the advantages of SHEETROCK with additional resistance to fire exposure—the result of a specially formulated core containing special mineral materials.

Facings of special FIRECODE "C" Gypsum Panels have qualified for fire ratings of up to 2 hours in walls, 3 hours in ceilings, 4 hours for column protection previously obtained only with heavier assemblies. See U.S.G. Construction Selector for description of tested assemblies.

Limitations (also refer to General Limitations, page 1): (1) In order to attain fire-resistance ratings, the construction of the partition and/or floor and ceiling assemblies must conform to the panel designs as tested at the indicated fire testing facilities (see U.S.G. System Folders). (2) Maximum spacing of frame members: 24" c. to c.

Width: 4'; length: 8', 9', 10', 12' or 14'; edges: eased, tapered; finish: ivory manila paper, suitable for paint, wallpaper or other decoration.

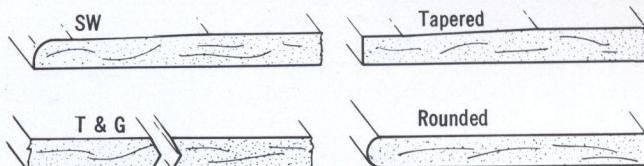
Foil-Back SHEETROCK is made by laminating special kraft-backed aluminum foil to back surface of regular or SHEETROCK SW panels. It is effective as a vapor barrier for exterior walls and ceilings when applied with foil surface next to the framing (1) in single-layer application, or (2) as the base layer in the double-layer system. A significant thermal insulating value is achieved when SHEETROCK is installed with the aluminum foil facing an air space of $\frac{3}{4}$ " minimum (for construction details, see U.S.G. Folder SA-923). The scuff-resistant metal foil reduces outward heat flow in winter, and inward heat flow in summer.

With Foil-Back SHEETROCK, the possibility of condensation within an exterior wall, and resulting exterior paint failures, is minimized. Meets ASTM requirements for a vapor permeability not exceeding 0.30 perm. **Limitation:** do not use as a base for ceramic or other tile. Thickness: $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{5}{8}$ ". Sizes, edges and finish: same as SHEETROCK SW Panels.

SHEETROCK W/R Gypsum Panels are a proven water-resistant base for the adhesive application of ceramic and plastic tile and plastic-faced wall panels. Made water-resistant all the way through: (1) multi-layered face and back paper are chemically treated to combat penetration of moisture; (2) the gypsum core is made water-resistant with a special asphalt composition. The panel is easily recognized because of its distinctive green face.

In addition to their use as a superior tile base in new construction, SHEETROCK W/R Panels are a cost-saver in modernization work. They permit new tilework to be installed over existing surfaces without tearing out old walls providing a vapor barrier does not exist. **Limitations:** adherence to recom-

Gypsum Panel Products—Types of Edges



Gypsum Panel Application and Frame Spacing

thickness	approx. weight psf.	location	application method	max. frame spacing c. to c.
$\frac{3}{8}$ " (1)	1.5	ceilings	horizontal	16"
$\frac{3}{8}$ " (1)	1.5	sidewalls	horizontal or vertical	16"
$\frac{1}{2}$ "	1.9	ceilings	vertical horizontal	16" 24"
$\frac{1}{2}$ "	1.9	sidewalls	horizontal or vertical	24"
$\frac{5}{8}$ "	2.4	ceilings	vertical horizontal	16" 24"
$\frac{5}{8}$ "	2.4	sidewalls	horizontal or vertical	24"

(1) For wood framing only

Bending of SHEETROCK Gypsum Panels

SHEETROCK thickness	bending radii with dry SHEETROCK	
	lengthwise	width
$\frac{1}{2}$ "	20' (1)	—
$\frac{3}{8}$ "	7½'	25'
$\frac{1}{4}$ "	5'	15'

(1) Bending two $\frac{1}{4}$ " pieces successively permits radii shown for $\frac{1}{4}$ " SHEETROCK.

NOTE: By moistening the face and back paper thoroughly prior to application, and replacing in the stack for at least one hour, the panel may be bent to still shorter radii. When the panel dries thoroughly, it will regain its original hardness.

mendations concerning sealing exposed edges, painting, tile adhesives, framing and installation is necessary for satisfactory performance (see Folder SA-924). Not recommended for application in ceilings.

Available in plain core, $\frac{1}{2}$ " and $\frac{5}{8}$ " thickness; also in $\frac{1}{2}$ " and $\frac{5}{8}$ " SHEETROCK W/R FIRECODE "C" Gypsum Panels for applications where a fire rating is desired—listed under UL Label Service R-1319-84 with following design numbers applicable: 45-min. U317; 1-hr. U305; 2-hr. U301, U411. Comply with ASTM C630. Width: 4'; length: 8', 10' or 12'; edges: tapered; finish: green treated manila paper, suitable for receiving tile, paint or wallpaper.

TEXTONE Panels are conventional gypsum panels with factory-applied vinyl facings in a wide range of coordinated decorator colors. The panels are used for predecorated permanent partitions, movable partitions or in remodeling. See U.S.G. Folder SA-928 for descriptions and specifications.

USG Coreboard has a 1" thick fireproof gypsum core encased in strong, gray liner paper on both sides. It is used in vent shaft and laminated gypsum partitions with additional layers of gypsum panels applied to the coreboard to complete the wall assembly. Manufactured with "V" T&G edges for use in solid partitions or with square edges and prescored 6" to 8" o.c. Coreboard strips are then easily snapped and separated from this master unit. Thickness: 1"; width: 24"; edges: "V" T & G or square; length: 8', 9', 10' and 12' (prescored—7'-8" lengths only); finish: gray paper, unsuitable as exposed surface.

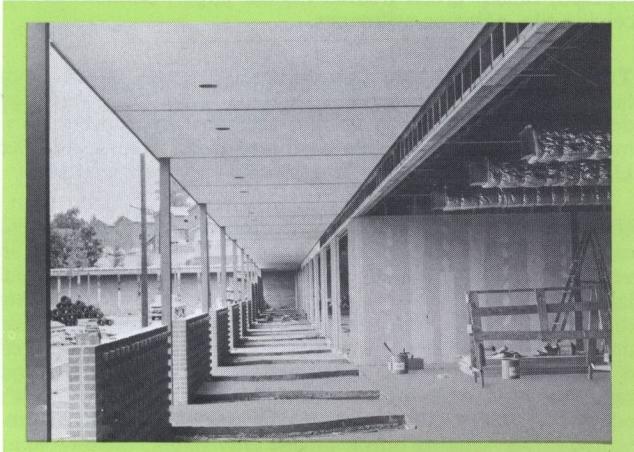
USG Shaft Wall Liner has a special gypsum core for added fire resistance and multi-layered green paper facings that are treated to resist moisture penetration. Used in USG Cavity Shaft Wall Partitions (see Folder SA-922) and Area Separation Walls (see Folder SA-924). Panels have beveled edges, are 1" thick, 16" and 24" wide and are available in lengths up to 16 ft.

PYROROCK Sound Underlayment Board is a high-strength gypsum product for lightweight, dry installation over interior plywood subfloors. Nailed or screw-attached, it offers a superior base for directly applied carpet and pad, vinyl tile or other durable floor covering. Qualifies for 1-hr. combustible fire rating—UL Design L523. Fire hazard classification: flame spread 20, fuel contributed 0, smoke developed 0. When combined with a resiliently attached gypsum panel ceiling, the assembly meets HUD requirements for sound control in multi-family dwellings. Compared to wet systems, PYROROCK eliminates job delays for curing, reduces floor weight as much as 10 psf often reducing framing costs, and requires only a single plate at party walls. Thickness: $\frac{3}{4}$ "; width: 48"; edges: square; length: 6 and 8 ft.; weight: 3.5 psf. **Limitation:** not recommended for bathrooms, laundry rooms or other locations where exposed to water.

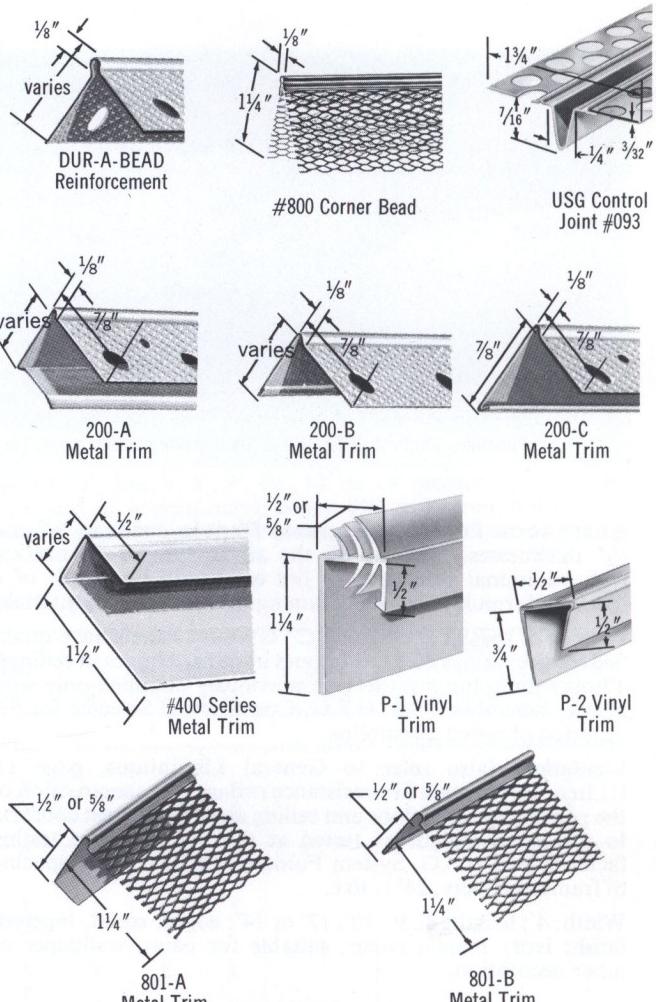
USG R. H. Base is a specially fortified gypsum panel, used with SHEETROCK R. H. Filler in electric cable ceilings. Available 4 ft. wide, regular $\frac{1}{2}$ " or $\frac{5}{8}$ " thick, FIRECODE $\frac{1}{2}$ " thick, 8 to 12-ft. lengths, edges rounded. Nailed or screw-applied to wood joists; screw-applied to USG metal furring channels or RC-1 resilient channels. The system (see U.S.G. Bulletin P-480) improves heat emission and resistance to heat deterioration. UL listed.

USG Exterior Gypsum Ceiling Board is a weather-resistant board designed for use on the soffit side of eaves, canopies and carports and other commercial and residential exterior applications with indirect exposure to the weather. It is noncombustible, is simply scored and snapped for quick application, and offers excellent paintability. Most important are its sag and water-resistance—which independent tests have shown superior to those of exterior grade plywood and structural laminated paper board. Fire hazard classification: flame spread 20, fuel contributed 5, smoke developed 0.

Installed conventionally in wood and metal-framed soffits; batten strips or moldings used over butt joints or joints treated; backing strips required for small vent openings. Has brown back paper and beige, water-repellent face paper. Thickness: $\frac{1}{2}$ "; width: 4'; lengths: 8 and 12 ft.; edges: eased. Also available in $\frac{5}{8}$ " thick FIRECODE Exterior Ceiling Board with fire-rated core.



USG Exterior Gypsum Ceiling Board



USG Trim Accessories

USG Sound Deadening Board is used as base layer under gypsum panels to reduce sound transmission in steel stud partitions (see Folder SA-923). Thickness: $\frac{1}{2}$ "; width: 48"; edges: square; lengths 8 and 9 ft.; flame spread classification 5; ASTM noncombustible Class A rating.

THERMAFIBER Insulation is a mineral fiber product ideal for improving sound control in partition and floor/ceiling constructions. **Insulating Blankets**, kraft paper enclosed, are used in wood frame construction. **M-S Blankets** are designed for insulating exterior furring and steel stud curtain wall assemblies. They are flangeless, open-faced on breather side and require separate vapor barrier. **Sound Attenuation Blankets** are a paperless, semi-rigid mineral fiber mat designed to improve STC ratings when installed within U.S.G. steel stud and gypsum tile partitions (see Folder SA-705).

USG Gypsum Sheathing is a fireproof gypsum board, $\frac{1}{2}$ " thick, with an asphalted gypsum core encased in specially formulated brown water-repellent paper on both sides and long edges. Its weather resistance, water repellence, fire resistance and low applied cost make it suitable for use in exterior curtain wall construction (see Folder SA-805); also a popular choice for wood-framed garden apartments and light commercial buildings. Available 24" wide, 8-ft. length with V-shaped T&G long edges and 48" wide, 8 and 9-ft. lengths with square edges.

USG Triple-Sealed Gypsum Sheathing is a low-cost structural sheathing for wood frame construction under many

description and utility

The complete and modern product line offered by United States Gypsum in paints and surface treatment is a natural outgrowth of the company's experience. As the world's largest producer of gypsum and other wall and ceiling construction materials, U.S.G. should know best how to *finish* those surfaces.

Today's full range of USG interior, exterior and special coatings reflects decades of research and testing, both in the laboratory and the marketplace. U.S.G. has the broadest job experience in the industry; 45% of all American homes are built or finished with its various products. Finishing products undergo daily analysis and improvement at the same Research Center where structural materials are developed—to meet standards of quality without compromise.

Use of USG Paints brings the important advantage of dealing with a single manufacturer who is responsible for all components of the finished wall or ceiling—lath and plaster or gypsum panels and joint treatment, drywall screws and adhesives, metal studs and accessories, insulation, sheathing, ceiling tile, gypsum roof deck, asphalt roofing and stucco or mineral siding. All are made by U.S.G. to *work together*, from DURACAL Texture for exterior surfaces, to FIRECODE 20, a newly released Classified Fire Hazard Coating for interior spray application.

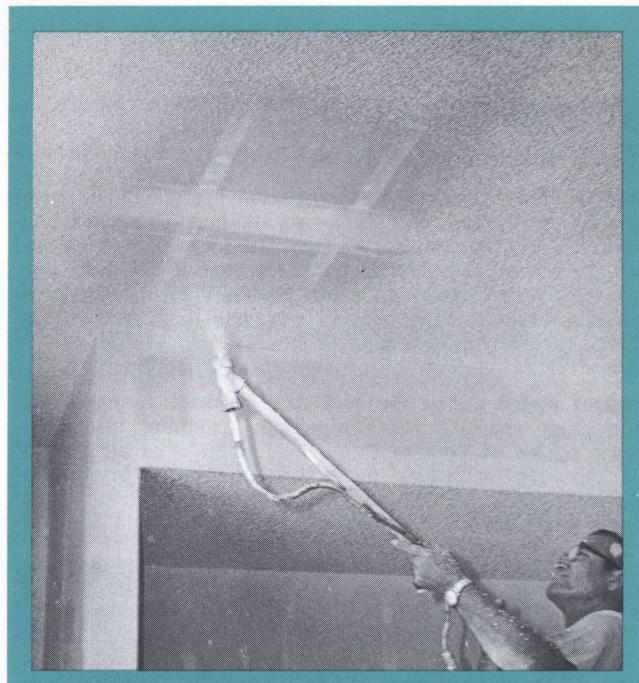
This catalog covers the finishing products recommended for virtually all U.S.G. partition and ceiling assemblies, as well as for exteriors. A complete, quick-reference Selector Guide appears on pages 4 and 5; general specifications start on page 7. Drywall joint treatment products are covered separately in Folder SA-927. USG paint products are available in six special-purpose groups:

Interior Finishes—emulsion line headed by GRAND PRIZE and TAL Latex Wall Paints, both flat and eggshell finish with matching latex semi-gloss enamel. In addition, spirit-thinned finishes including PRO-KYD Alkyd Flat Wall Paint, DIAMOND Lustre and Eggshell Enamels, Satin Lustre Enamel.

Exterior Wood and Masonry Coatings—continuing evaluation at U.S.G. Research shows water-based emulsion, breather-type house paints perform superbly over wood siding and shingles as well as masonry surfaces; performance history now favors latex over solvent-based paints for house exteriors. GRAND PRIZE One-Coat Latex House Paint (medium gloss) and Latex House and Trim Enamel (high gloss) are U.S.G.'s premium products. Latex primers are available for wood and metal. USG Vinyl Acrylic Latex House Paint provides low-sheen protection and beauty for primed wood and masonry. Full color range solvent finishes include IMPERIAL Gloss House Paint, USG Low-Lustre House Paint and Porch & Floor Enamel. Masonry coatings are CEMENTICO Masonry Coating, DURABOND Masonry Waterproofing, USG Latex Floor Paint.

Wood Stains and Varnishes—pigmented USG Wood Stains, available in eight colors, are outstanding in uniformity of final finish. DURABOND Latex Rustic Stains offer solid and semi-transparent colors for exteriors. Varnish products include USG Polyurethane Clear Finish.

Texture Finishes—the industry's broadest line, leading the resurgence of surface ornamentation, includes ready-to-use USG Texture I sand-finish and Texture II ripple-finish; IMPERIAL QT Texture Finish for an acoustical appearance on ceilings; USG Spray Texture; A-B Tex and USG R/M Smoothcoat and Texture for special effects and DURACAL Texture for exterior spray application to most surfaces.



Surface Preparation Products—long-established leadership items are USG Vinyl Sealer, SHEETROCK Sealer and pigmented TEXOLITE Primer-Sealer; line includes latex and alkyd interior primers, enamel undercoat, oil-based exterior primers, penetrating sealer, block filler and spackling compounds.

Special Coatings—rising fast in architectural preference are FIRECODE 20, a new fire-resistant latex coating, and ACREPOX Enamel Coating system providing sanitary ceramic-like protection for walls. Also excelling in maintenance value are METAL COAT Enamel and three companion primers to retard and prevent rust.

general limitations

The most common causes of paint failures on interior surfaces are: (a) Base surface not dry; (b) Surface improperly cleaned and patched; (c) Variable suction in the base; (d) Failure to use proper treatment for different surfaces, conditions, and finishes. It is estimated that 75% of interior paint failures are due to neglected or improper preparation before the paint can was opened.

Satisfactory results with USG paint products, as with all finishes, depend upon good job practices:

- Surfaces to be painted must be clean, dry, sound; free of grease, oil, wax, other foreign matter; free of flaking, crumbling or chalking conditions; must be properly prepared.
- Atmospheric and structural temperatures must be 50° to 60° minimum during application, depending upon type of finish; consult directions.
- Paints of the water-thinned type should not be used over wallpaper having water-soluble colors; must be protected from freezing.
- New unpainted plaster (except veneer plaster), stucco, poured concrete, patches in masonry surfaces must age 30 to 60 days minimum prior to paint application; consult directions.

Any other limitations are stated in the label directions for each product.

types and functions

1. Interior Wall and Ceiling Paints

GRAND PRIZE Latex Wall Paint—vinyl acrylic flat or velvet eggshell finish, ready to use. Resists alkalinity in plaster, concrete and joint treatment. Exceptional hide, low sheen and extreme washability. The premium latex paint in U.S.G. line, covers most surfaces in one coat. Quick-drying, with excellent leveling qualities. Vinyl-acrylic latex vehicle. 8 ready-mixed colors, matched in two enamels below. Also available in 54 designer-selected deep color accents in eggshell finish.††

GRAND PRIZE Latex Semi-Gloss Enamel—premier medium-gloss enamel, water-thinnable, matching all ready-mixed colors of GRAND PRIZE wall paint. For all interior surfaces where semi-gloss finish is desired. Quick-drying, but good leveling. Superior hide, gives uniform sheen in 40° range; highly washable and stain-resistant. Self-priming on new drywall surfaces. Acrylic copolymer emulsion vehicle.††

USG Satin-Lustre Enamel—spirit-thinned alkyd semi-gloss matching all ready-mixed colors of GRAND PRIZE wall paint. For wood trim and wall surfaces of kitchen, bath, laundry; sealer or undercoater required on new work and porous surfaces. Dries to medium sheen with outstanding washability, excellent color retention. Alkyd oil resin vehicle.††

USG Spray Coat—spray-applied latex coating for unpainted gypsum panels and most interior surfaces. Produces smooth heavy film of uniform sheen over hard or porous surfaces. Highly scrubbable; burnish and stain-resistant; fast drying. Available in four types: **Soft Lustre**, a semi-gloss eggshell finish, smooth or may be lightly textured in application; **Matte Finish**, a flat enamel finish with heavier texture; **Flat Finish**, a dull, dead-flat finish; **Diamond Finish**, producing appearance of sand float finish. Acrylic latex vehicle.

TAL Latex Wall Paint—ready-to-use flat or eggshell finish, offers good quality with economy, easy-flowing application. Good one-coat hide can usually be achieved; provides a washable film. Vinyl-acrylic latex vehicle, uses water for thinning and cleanup. 14 colors, matched in **TAL Latex Semi-Gloss Enamel**. Eggshell finish in white and off-white only.††

PRO-KYD Alkyd Flat Wall Paint—outstanding spirit-thinned finish for interior walls and woodwork. Excellent hide and leveling, readily washable. Self-priming except over patched, porous or unpainted surfaces. Soya alkyd resin vehicle. Available in white and machine tint bases.

DIAMOND Lustre and Eggshell Enamels—high-gloss and low-lustre finishes of extreme durability to meet the most stringent maintenance demands. Spirit-thinned; provide flexible film with exceptionally high hide. Soya alkyd resin vehicle. White and tint bases available.††

††For flame spread and smoke resistance, request applicable Data Sheet.

USG Exceptional Color System: more than 1,350 appealing custom colors are available on special order through dealers using USG Paint Colorants. This range offered in 11 products—GRAND PRIZE Latex Wall Paint, oil-based PRO-KYD Alkyd Flat Wall Paint, GRAND PRIZE Latex Semi-Gloss Enamel, alkyd oil-based USG Satin-Lustre and DIAMOND Lustre and Eggshell Enamels, oil-based IMPERIAL Gloss House Paint, GRAND PRIZE One-Coat Latex House Paint, GRAND PRIZE Latex House & Trim Enamel, FIRECODE 20 Classified Fire Hazard Coating and R/M CEMENTICO Masonry Coating. Special machine colors also available in USG Wood Stain and DURABOND Latex Rustic Stain.

2. Exterior and Masonry Coatings

IMPERIAL Gloss House Paint—U.S.G.'s finest oil-based gloss finish, with a balanced oil-based formula for long weather resistance. Heavy-bodied, with superior hiding and controlled chalking qualities. Tough, flexible film resists cracking and checking, offers maximum protection for substrates. Excellent adhesion, mildew and fume resistance. One coat is sufficient on most surfaces when used over IMPERIAL House Primer. Linseed oil vehicle. 3 ready-mixed colors, plus white. Also available, in white only, is **IMPERIAL One-Coat House Paint** for one-coat finish on most repaint work, exceptional durability and hide; used over IMPERIAL House Primer #894 or USG Latex House Primer #684 on new wood.



USG Low-Lustre House Paint—solvent-thinned, quality low-sheen exterior finish offers superior hiding in one coat over primed surfaces—wood shingles and shakes, all types of siding. Self-priming when used over most previously painted surfaces. Linseed alkyd resin vehicle. Available in 5 ready-mixed colors which may be intermixed.

GRAND PRIZE One-Coat Latex House Paint—breather-type modified acrylic emulsion with major advantages over other types: quick-drying, non-yellowing, longer-lasting, mildew-resistant, good bond, pleasing medium lustre. Has excellent hide, controlled chalking. Resistant to alkali, does not readily blister, fade, or stain. Suitable for wood siding and shingles, masonry, stucco, weathered asbestos cement. Modified acrylic latex emulsion vehicle. 13 colors and machine tint bases.

GRAND PRIZE Latex House & Trim Enamel—water-thinned, high gloss finish provides long-lasting protection for wood trim and siding. Spreads easily, dries fast. One coat usually covers; gives two-coat beauty. Acrylic and polyester resin vehicle. Provided in 8 ready-mixed colors, plus black, white and machine tint bases.

USG Vinyl Acrylic Latex House Paint—an economical non-penetrating coating for unglazed masonry, stucco, wood shakes and primed siding. Combines good hiding, weather resistance, true non-fading color, quick drying. Breather-type formulation permits unwanted moisture to escape. Two coats produce best results. 15 colors.

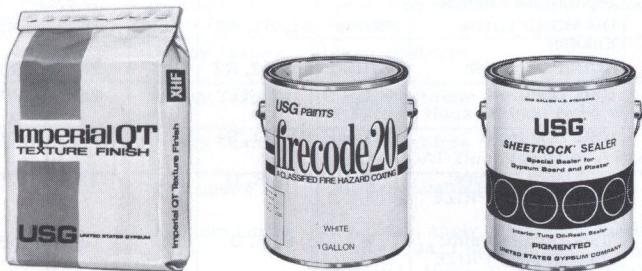
DURACAL Texture—a thick, solvent-based or latex aggregated coating for spray application to old or new wood, metal, concrete surfaces; asbestos siding. Heavy texture hides most surface blemishes. Flexible, mildew and water-resistant when applied as recommended. White and special colors in 100-gal. quantities or more.

USG Porch & Floor Enamel—polyurethane modification provides tough, hard-wearing gloss finish for wood and concrete floors, walls and dados in recreation and laundry rooms, corridors, etc. Resists heavy moisture, heat, stains, grease. Quick-drying, water-repellent, alkali-resistant. Spirit-thinned; toluene diisocyanate soya alkyd copolymer vehicle. 5 colors.

USG Latex Floor Paint—a tough, medium sheen finish for interior or exterior floors of previously painted or primed concrete or wood. Fortified with polyester resins for wear resistance. Alkaline-resistant, quick-drying, normally bonds without etching, but firm, non-dusty surface is mandatory. White and five dark colors.

CEMENTICO Masonry Coating—a water-repellent hydraulic cement base paint in powder form, to be mixed with water. For interior and exterior porous masonry surfaces. Excels in hardness, durability and workability at low cost. Two coats recommended; sand may be added for coating to be scrubbed into masonry to make smoother, denser surface. Available in white only, it is lime-proof, alkali-resistant. A ready-mixed sanded product, R/M CEMENTICO Masonry Coating, is available in both white and machine tint bases.

DURABOND Waterproofing Coating-Ready-Mixed—a heavy-bodied coating to decorate and protect porous masonry surfaces against water penetration. Performance backed by 5-year limited warranty. Alkali- and mildew-resistant over unpainted surfaces. Applied in two coats alone or over DURABOND Hydraulic Waterproofing Compound (see Surface Preparation Products). Meets Fed. Spec. TT-P-1411A. White only, tintable to light pastels. **DURABOND Waterproofing Coating**, a sanded powder product, is also available in white only. Special DURABOND Waterproofing Latex Additive should be specified with the powder product to improve adhesion, harden surface and minimize dryout problems.



3. Wood Stains and Varnishes

USG Wood Stains—pigmented stains with controlled penetration to bring out the natural beauty of wood paneling, furniture, etc. Alkyd solids content permits partial seal of surface, more uniformity of final finish. Non-bleeding, non-fading, minimum grain raise. Versatile in application—may be sprayed, dry brushed, wiped, or used full strength. Available in 7 popular stains for interior use, plus Redwood for interior or exterior; stains may be intermixed for special requirements. Linseed-phenolic resin vehicle. 6 ready-mixed colors plus 48 with tint base.

DURABOND Latex Rustic Stains—richly pigmented, solid or semi-transparent stains with exceptional hiding qualities for new work and refinishing of wood siding, shakes, fencing, beams and soffits. Allows wood texture to show through. Alkaline-resistant, may be used on concrete surfaces. Not recommended for abraded plywood. Vinyl acrylic latex vehicle. 6 ready-mixed colors plus 48 with tint base.

USG Polyurethane Clear Finish—an interior-exterior pale varnish to meet the highest durability requirements in fine floors, woodwork, exterior doors, boat decks, etc. Gives

clear transparent water-resistant finish, easier handling because it is a one-component system. Special vehicle compound of soya oil modified polyurethane provides good adhesion when recoated. Available in Gloss and Satin finishes.

4. Interior Texture Finishes

USG Texture I—a ready-to-use vinyl-acrylic paint embodying a fine aggregate to produce a slight sand-finish effect combined with light texture. One coat covers fine cracks, blemishes. Quick-drying, tintable.

USG Texture II—low-gloss ripple finish in a latex emulsion. Contains no sharp aggregate, can produce fine textures ranging from "orange peel" effect to smooth rounded stipple. Conceals moderate imperfections, normally requires no sealer. Quick-drying, washable, recoatable. Tintable.



One of several finishes possible with versatile USG Texture II for accent walls or contrast of materials.

USG R/M Smoothcoat and Texture—a heavy-bodied, ready-to-use, vinyl acrylic interior finish. Job-thinned with water for desired effect—smooth, roller-texture or specified texture design. Conceals imperfections; dries to hard white surface. May be tinted with GRAND PRIZE Wall Paint or machine colorants.

USG Painter's Sanded Paste Stipple—a low-cost, water-base sanded finish for interior walls and ceilings. Tinting not recommended; readily coated with most wall paints.

IMPERIAL QT Texture Finish—aggregated powder, produces acoustical finish appearance on ceilings; provides no acoustical correction. Excellent bonding qualities; helps conceal surface defects. Formulated with vermiculite, polystyrene or perlite aggregates for spray application in coarse or regular textures. Also available ready-mixed. White only. First coat of PRO-KYD Alkyd Flat Wall Paint or USG Vinyl Sealer recommended. Fire hazard classification: flame spread 10, fuel contributed 10, smoke developed 0 for polystyrene-aggregated formulation applied over SHEETROCK Panels. *Limitation:* not recommended for use where humid conditions exist.

Powder Textures—other textures available include: A-B TEX Texture Paint, USG Spray Texture and USG Multi-Purpose Texture for fog coats, light stipples and "orange peel" textures.

(continued on page 6)

SELECTOR GUIDE TO USG PAINT PRODUCTS

construction materials	type of finish desired	special surface treatment new work redecorating		finish product description	thinners	method application	hours drying time touch recoat	one gal. coverage (sq. ft.)
INTERIOR WALLS Block, Brick, or Concrete	Velvet, Smooth Surface	USG Super Block Filler	USG Super Block Filler (opt.)	GRAND PRIZE Flat or Eggshell Wall Paint	NR/w	B1, R1, S1	½ 8	450
	Velvet, Natural Texture	TEXOLITE Primer-Sealer	None	GRAND PRIZE Flat or Eggshell Wall Paint	NR/w	B1, R1, S1	½ 8	450
	Flat, Smooth Surface	USG Super Block Filler	USG Super Block Filler (opt.)	TAL Latex Flat or Eggshell Wall Paint	NR/w	R1, S1, B2	½ 8	400
	Flat, Natural Texture	TEXOLITE Primer-Sealer	None	TAL Latex Flat or Eggshell Wall Paint	NR/w	R1, S1, B2	½ 8	400
	Semi-Gloss, Smooth Surface	USG Super Block Filler	TEXOLITE Primer-Sealer	USG Satin-Lustre Enamel	NR/ms	S1, B2, R2	3 24	450-500
	Semi-Gloss, Natural Texture	USG Alkyd Enamel Undercoat	USG Alkyd Enamel Undercoat	USG Satin-Lustre Enamel	NR/ms	S1, B2, R2	3 24	450-500
	Gloss, Smooth Surface	USG Super Block Filler	USG Alkyd Enamel Undercoat	DIAMOND Lustre Enamel	NR/ms	S1, B2, R2	3 24	450
	Gloss, Natural Texture	USG Alkyd Enamel Undercoat	USG Alkyd Enamel Undercoat	DIAMOND Lustre Enamel	NR/ms	B1, R1, S1	3 24	450
	Epoxy Glaze, Smooth	USG Super Block Filler	USG Super Block Filler	ACREPOX Finish	SS/USG	B1, R1, S1	4 8	190-320
	Cement, Smooth Cement, Sanded	Pre-wet	Clean, pre-wet	CEMENTICO Coating	W	B1, S2	— 24	16-24/lb.
		Pre-wet	Clean, pre-wet	DURABOND Water-proofing Coating	W	B	— 24	16-24/lb.
Plaster	Velvet	TEXOLITE Primer-Sealer	None	GRAND PRIZE Flat or Eggshell Wall Paint	NR/w	B1, R1, S1	½ 24	450
	Flat	TEXOLITE Primer-Sealer	None	PRO-KYD Alkyd Flat	NR/ms	R1, S1, B1	1 24	400
	Semi-Gloss	TEXOLITE Primer-Sealer	USG Alkyd Enamel Undercoat	USG Satin-Lustre Enamel	NR/ms	S1, B2, R2	3 24	450-500
	Gloss	TEXOLITE Primer-Sealer	USG Alkyd Enamel Undercoat	DIAMOND Lustre Enamel	NR/ms	S1, B2, R2	3 24	450
	Epoxy Glaze	USG Penetrating Sealer	ACREPOX Finish	ACREPOX Finish	SS/USG	S1, B2, R2	4 8	190-320
Gypsum Panels	Velvet	USG Vinyl Sealer or TEXOLITE Primer-Sealer	GRAND PRIZE Latex Wall Paint	GRAND PRIZE Flat or Eggshell Wall Paint	NR/w	B1, R1, S1	½ 24	450
	Flat	USG Vinyl Sealer	Prime if needed	PRO-KYD Alkyd Flat	NR/ms	R1, S1, B1	3 24	400
	Semi-Gloss	GRAND-PRIZE Latex Semi-Gloss Enamel	Self-priming	GRAND PRIZE Latex Semi-Gloss Enamel	NR/w	S1, B1, R1	½ 24	450
	Gloss	TEXOLITE Primer-Sealer	USG Alkyd Enamel Undercoat	DIAMOND Lustre Enamel	NR/ms	S1, B1, R2	3 24	450
	Epoxy Glaze	ACREPOX Finish	ACREPOX Finish	ACREPOX Finish	SS/USG	S1, B2, R2	4 24	190-320
	Sand Float Texture	None	None	USG Texture I	NR/w	B1, R1	½ 24	200
	Orange-peel to Ripple Texture	None	None	USG Texture II	NR/w	B1, R1, S1	1 24	200
	Heavy Stipple or Period Texture	As required	As required	USG Motif Texture; then GRAND PRIZE Paint	W	B, R, O	1 12	125-300
	Medium Light to Medium Heavy Texture	Usually none	None	USG Texture Paint; then GRAND PRIZE Paint (also 2 finishes below)	W	B, R, O	1 12	27-54/lb.
Wood	Medium Light to Very Light Text. Sand Finish	Usually none	None	A-B TEX or USG Spray Texture	W	B, R, S, O	1 12	27-54/lb.
	Fire-resistant	None	None	USG Painter's Sanded Paste Stipple	W	B, R	1 12	200
				FIRECODE 20 Coating	NR/W	S1, R2	½ 8	80-175
Metal (Ferrous)	Semi-Gloss	USG Alkyd Enamel Undercoat	USG Alkyd Enamel Undercoat	USG Satin-Lustre Enamel	NR/ms	S1, B1, R2	3 24	450-500
	Gloss	USG Alkyd Enamel Undercoat	USG Alkyd Enamel Undercoat	DIAMOND Lustre Enamel	NR/ms	S1, B1, R1	3 24	450
Metal (Bright)	Flat	USG Alkyd Enamel Undercoat	None—dull gloss	PRO-KYD Alkyd Flat	NR/ms	R1, S1, B1	1 24	400
	Clear Finish	2 coats Finish	1 coat Finish	USG Polyurethane Clear Finish	NR	B only	2 12	500
Metal (Galvanized)	Flat (Water Thinned)	METAL COAT Iron Oxide Primer	None, if free of rust	GRAND PRIZE Flat or Eggshell Wall Paint	NR/w	B1, S1, R2	½ 8	450
	Gloss (Solvent Thinned)	METAL COAT Iron Oxide Primer	None, if free of rust	METAL COAT Enamel	NR/ms	B1, S1, R2	2 24	600
	Aluminum or Gloss	METAL COAT Zinc Chromate Primer	None, if free of rust	USG Aluminum Coating or METAL COAT Enamel	NR/ms	B1, S1	2 24	600
	Gloss	METAL COAT Zinc Dust Primer	None, if free of rust	USG Latex Primer-Finish for Metal	NR/ms	B1, S1, R2	2 24	600

NOTES: "Drying Time" and "Coverage" estimates are based on average conditions. Touch = furniture can be returned to living areas.

Abbreviations, Method of Application: B = brush, R = roller, S = spray, T = trowel, O = other; 1, 2, 3 = order of preference. Abbreviations, Thinners: NR/w —Not recommended, use water sparingly; NR/ms—Not recommended, use mineral spirits if needed; SS/USG—Special Solvent manufactured by U.S. Gypsum; W—water per directions.

SELECTOR GUIDE TO USG PAINT PRODUCTS

construction materials	type of finish desired	special surface treatment new work redecorating		finish product description	thinners	method application	hours drying time touch recoat	one gal. coverage (sq. ft.)	
INTERIOR CEILINGS Acoustical Tile or Plaster	Low Sheen	None	None	GRAND PRIZE Latex Semi-Gloss Enamel TEXOLITE Std. Paint	NR/w	B1, R1, S2	½	8	400
	Flat (Low Scrub)	None	None		NR/w	R1, S1	½	8	350
Gypsum Panels	Flat (Med. Scrub)	None, or TEXOLITE Primer-Sealer	None	USG Super Ceiling White	NR/w	B1, R1, S2	½	8	250
	Flat (High Scrub)	TEXOLITE Primer-Sealer	GRAND PRIZE Latex Wall Paint	GRAND PRIZE Latex Ceiling White Paint	NR/w	B1, R1, S1	½	8	450
Plaster	Textured	USG Texture I or II		Any of above finishes for gypsum panels	see above	see above	see above	see above	see above
	Flat	TEXOLITE Primer-Sealer	TEXOLITE Primer-Sealer	PRO-KYD Alkyd Flat	NR/ms	B1, R1, S1	1	24	400
Plaster, Drywall, or Poured Concrete	Flat	None, or TEXOLITE Primer-Sealer		Any USG latex paint shown for int. walls	—	—	—	—	—
	Rough Texture	PRO-KYD Alkyd Flat	PRO-KYD Alkyd Flat	IMPERIAL QT Texture Finish	W	S only	24	not rec.	—
Poured Concrete	Smooth; Level	None	None	A-B TEX Paint	W	T1	1	12	variable
FLOORS & PATIOS Firm Poured Concrete, Brick, Asph.	Medium Sheen	None, if clean, non-dusting; or USG Penetrating Sealer	None; clean, firm	USG Latex Floor Paint	NR/w	B1, R1	½	24	350
Wood or Concrete	High Sheen	USG Penetrating Sealer; or self-prime	None; clean, firm	USG Porch & Floor Enamel	NR/ms	B1, R1	4	12	400
EXTERIOR SURFACES									
New—Block, Brick, Stucco or Poured Concrete	Low Sheen	2 coats		USG Vinyl Acrylic Latex House Paint	NR/w	B1, R1, S1	½	8	350
	Medium Lustre	2 coats		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	350
Old, Light Chalk—Block, Brick, Stucco or Poured Concrete	Low Sheen	Clean, dust-free, wire brush off chalk, 2 coats		USG Vinyl Acrylic Latex House Paint	NR/w	B1, R1, S1	½	8	350
	Medium Lustre	Clean, dust-free, wire brush off chalk, 2 coats		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	350
Old, Heavy Chalk—Brick, Block, Stucco or Poured Concrete	Low Sheen or Medium Lustre	Clean, dust-free, wire brush off chalk, apply USG Penetrating Sealer & 2-coat finish		USG Vinyl Acrylic Latex House Paint	NR/w	B1, R1, S1	½	8	350
	Gloss	USG Penetrating Sealer		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	12	400
Old or New (unpainted) Block, Brick, Stucco or Poured Concrete	Smooth (Cement)	Clean, free of dust, porous—pre-wet, post-wet		CEMENTICO Coating	W	B1, S1	—	24	16-24 (per lb.)
	Sanded (Cement)	Clean, free of dust, porous—pre-wet, post-wet		DURABOND Water-proofing Coating	W	B, T	—	24	16-24
Asbestos Siding	Heavy Texture	Clean, dust-free		DURACAL Texture	NR/ms	S only	12	24	35-60
Wood Surfaces	Heavy Texture	Clean, dust-free IMPERIAL House Primer #894 White		DURACAL Texture	NR/ms	S only	12	24	35-60
Metal	Heavy Texture	Clean, dust-free METAL COAT Zinc Chromate Primer		DURACAL Texture	NR/ms	S only	12	24	35-60
New—Unpainted Wood	Low Lustre	USG Low-Lustre House Paint		USG Low-Lustre House Paint	NR/ms	B only	2	24	450
	Medium Lustre	Dry, clean, apply one coat IMPERIAL House Primer #894, 1 or 2 coats finish paint		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	400
	Gloss	IMPERIAL House Primer #894 White, or Latex House Primer #684		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	12	400
	Clear Gloss	Prime with USG Wood Stain		USG Polyurethane Clear Finish-Gloss	NR	B1, R1, S1	2	12	500
	Full Stain	DURABOND Latex Rustic Stain		DURABOND Latex Rustic Stain	NR	B1, R1, S1	2	18	300
Repaint—Wood Medium Chalk	Low Lustre	Wipe off chalk and dirt		USG Low-Lustre House Paint	NR/ms	B1, S1, R1	2	24	450
	Medium Lustre	Dust off dirt and cobwebs, wash off chalk		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	400
	Gloss	Wire brush, wipe off chalk and dirt, prime bare spots		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	12	400
Repaint—Wood Heavy Chalk	Low Lustre	Wire brush, dust and clean		USG Low-Lustre House Paint	NR/ms	B1, S1, R2	2	24	450
	Medium Lustre	Wash with hose and rag, flush with water		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	400
	Gloss	Wire brush, dust, prime with IMPERIAL House Primer #894 White		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	12	400
Pre-Primed Wood Siding	Low Lustre	None		USG Low-Lustre House Paint	NR/ms	B1, S1, R1	2	24	450
	Medium Lustre	None		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	400
	Gloss	None		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, S1, R1	1	12	400
Hardboard Siding	Medium Lustre	IMPERIAL House Primer #894 White		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	400
Asphalt	Low Sheen Medium Lustre	Clean, firm, tight backing		GRAND PRIZE or USG Vinyl Acrylic Latex House Paint	NR/w	B1, R1, S1	½	8	400
Metal	Gloss	See primers under "Interior Walls"		METAL COAT Enamel	NR/ms	B1, S1, R2	2	24	600

5. Surface Preparation Products

TEXOLITE Primer-Sealer—a pigmented latex product for use under any type of paint or enamel, performs better under water-thinned paints than any other sealer. Locks in lime, equalizes suction, lays paper and fiber nap, provides "tooth". White only, but may be tinted with USG Paint Colorants.

SHEETROCK Sealer—a tung oil resin emulsion sealer for use over gypsum panels; also unsurpassed in bridging and filling hairline cracks in plaster. May be used under most interior paints and wallpaper. Equalizes porosity over joint reinforcement and face paper. Especially recommended for kitchens and bathrooms. Tintable to shade of finish coat.

USG Vinyl Sealer—a pigmented, quick-drying primer-sealer for use on interior gypsum panels, plaster, canvas, concrete block. Recommended for use under alkyd paints and enamels, and under IMPERIAL QT Texture Finish to minimize joint flashing. May be tinted.

USG Latex Primer-Finish for Metal—for clean interior or exterior metal surfaces. Rust-inhibiting pigments provide corrosion resistance and durability. Use at least two coats for exteriors. White, may be tinted and used as finish coat in exterior application. Acrylic latex vehicle.

USG Alkyd Enamel Undercoat—alkyd base mineral spirit undercoat for interior gloss, semi-gloss or flat oil paints. Not a sealer, but provides low-cost good first coat; fills and equalizes surface to be painted. May be tinted.

USG Penetrating Sealer—a special non-pigmented alkyd resin solution in spirits, designed to condition exterior or interior surfaces which are porous or moderately chalky; forms firm, tight base for repainting with any paint except cement bonding type.

USG Latex House Primer #684—for exteriors under GRAND PRIZE Latex House & Trim Enamel and House Paint. Quick drying; stain and mildew-resistant; lead-free. White only.

IMPERIAL House Primer #894—oil-base primer to prepare new or chalky wood surfaces for GRAND PRIZE or IMPERIAL One-Coat House Paint. Lead-free, blister-resistant, breather-type coating. White only.

USG Super Block Filler—conceals voids, fills pores, gives uniform finish over interior, exterior masonry and other rough surfaces. Not a waterproofing material; may be coated with any paint except cement bonding type—IMPERIAL House Paint or GRAND PRIZE One-Coat Latex House Paint recommended for exteriors. May be tinted. Unaggregated.

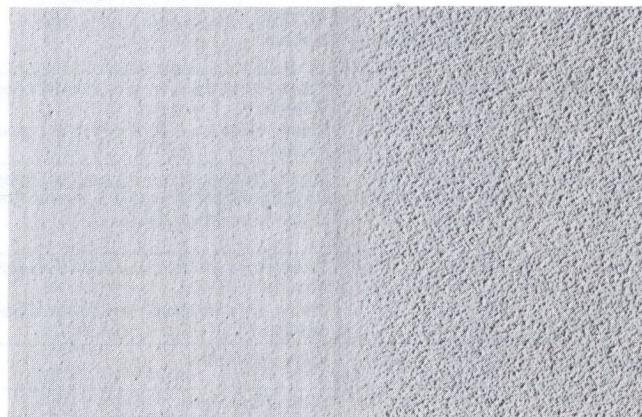
DURABOND Hydraulic Waterproofing Compound—a quick-setting hydraulic powder compound to control water penetration, plug cracks and openings in masonry. Also excellent for anchoring fixture bolts. Natural color, may be overcoated with DURABOND Waterproofing Coating Colors.



6. Special Coatings

FIRECODE 20 Classified Fire Hazard Coating—a formulation for interior application in schools, hospitals and commercial buildings where fire resistance and smoke generation are critical. For spray application, primarily on unpainted gypsum walls and panels, but also suitable for plaster or unglazed masonry surfaces. May be roller-applied using two or three coats.

FIRECODE 20 is a white, high-build, washable flat latex coating; may be tinted with USG Paint Colorants. For 90 sq. ft. per gal. coverage, fire hazard classification: flame spread 20 when applied over SHEETROCK Gypsum Panels, or flame spread 10 over $\frac{1}{4}$ " asbestos-cement board; fuel contributed 0, smoke developed 0. For 175 sq. ft. per gal. coverage, fire hazard classification: flame spread 20 over SHEETROCK Panels or 15 over asbestos board; fuel contributed 5 over gypsum panels or 0 over asbestos board, smoke developed 0.



At 2x magnification, FIRECODE 20 test sample is nearly new after 800 scrub cycles.

ACREPOX Finish—two-component system to provide a smooth, tile-like surface over concrete block, masonry, wood, gypsum panels, metal or hardboard. Exceptionally durable, it resists abrasion and stains, offers high film build and excellent drying. Consists of:

ACREPOX Enamel is a high solids polymer formulation available in six colors. It is mixed with **ACREPOX Enamel Activator** for curing and hardening into a chemical-resistant coating providing maximum performance. For spraying consistency and to aid in equipment cleanup, **ACREPOX Thinner** is used. For thorough sanitary protection of masonry block, two or three coats of ACREPOX Enamel are applied over **USG Super Block Filler**. Over masonry and over ferrous metal surfaces for rust retardance, and where a chemical and alkali-resistant coating is desired, **ACREPOX Epoxy Primer** is used. Prior to use, the primer is mixed with special **ACREPOX Epoxy Primer Catalyst** as the curing and hardening agent.

METAL COAT Enamel—a durable gloss finish, highly weather resistant, for interior and exterior metal surfaces. Spirit-thinned; soya alkyd resin vehicle. Comes in 11 safety colors ideal for equipment identification in plants. Used over any of three rust-retardant special primers: **Zinc Chromate**, for bright metals; **Iron Oxide**, for ferrous metals; **Zinc Dust**, for zinc and galvanized surfaces.

Industrial Finishes—Shop coats, primers and other special coatings marketed by U.S.G. Paint Division.

general painting specifications

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be applied in accordance with its current printed directions.

1.3 submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials, which, when approved shall be the standards of finish to be provided on this project.

1.4 delivery and storage of materials

- a. All materials shall be delivered in their original containers bearing the manufacturer's name, brand name and directions for use.
- b. All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 environmental conditions

- a. During cold weather, thermostatically controlled heat shall be provided to maintain (50°) (55°) (60°F) temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used to provide heat. Adequate ventilation shall be provided at all times for proper drying.
- b. For exterior painting, atmospheric and surface temperatures shall be above 50°F. Paint shall not be applied in damp, foggy or rainy weather.

Part 2: products

2.1 materials

(Specify surface treatment and finish materials from product descriptions and Selector Guide in this catalog. For Federal Specification paints, Industrial Finishes and other paints, ask your U.S.G. representative for recommendations, color samples, etc.)

2.2 colors

Colors of paints shall (match control samples) (match color chips specified) (be as scheduled).

2.3 tinting and mixing

Paints shall be tinted and mixed to specified colors using USG Paint Colorants and delivered ready-mixed to job site.

Part 3: execution

3.1 surface preparation

- a. Before painting, prepare surfaces as required in product directions. The base surface must be sound, firm and dry, clean and free of dust, dirt, grease or other foreign material.

b. Interior plaster surfaces—on old plastered walls, fill all hairline cracks with DURABOND Spackling Putty. Fill larger cracks with DURABOND Patching Plaster. Sand rough edges and allow time for spackled and filled areas to dry. Dull the glossy areas by rubbing lightly with fine steel wool or washing with a strong washing powder solution followed by a thorough rinse with clean water. Allow to dry before proceeding. Touch up the spackled and patched cracks and areas with SHEETROCK Sealer. Allow to dry. Follow with a brushed-on coat of SHEETROCK Sealer over all areas. On newly plastered surfaces, treat cracks and gouges in the same manner as for old walls. Apply a coat of TEXOLITE Primer-Sealer. When reinforcement of white coat is needed, use USG Penetrating Sealer.

c. IMPERIAL veneer plaster surfaces—proper sealing of surface is essential. Surface must be sound and dry as outlined above; repair minor imperfections with DURABOND Paste Spackling Compound or USG Ready-To-Use Joint Compound-All Purpose. When dry, apply one or more coats of TEXOLITE Primer-Sealer of (if surface is weak, friable or chalky) apply USG Penetrating Sealer. Tint the primer-sealer coat to aid in detection and repair of surface defects; seal any patches or fills revealed after first primer-sealer application. Either water-thinned or solvent-thinned flats or enamels may be used for finish coats.

d. Interior gypsum panel surfaces—prepare joints and fastener heads with (USG) (DURABOND) Joint Compound (see Specifications in U.S.G. Folder SA-927).

e. Interior wood surfaces (except floors)—in new wood not previously painted, sand smooth and touch up knots, sap streaks and pitch spots with shellac.

f. Interior metal surfaces—remove grease, oil and plaster spatterings, rust and mill scale.

3.2 application

a. Apply finishes according to product directions. Finishes must be evenly spread and free from runs, sags and other blemishes. Allow all coats to dry before applying following coats. On enamel and varnish finishes, sand lightly and remove dust between coats.

Note to architect: Where more detailed specification is desired, select from specialty applications shown below.

b. SHEETROCK W/R Gypsum Panels—Seal SHEETROCK W/R Panels with SHEETROCK Sealer or USG Alkyd Enamel Undercoat as prime coat. Apply finish coat of USG Satin-Lustre Enamel DIAMOND Lustre or Eggshell Enamel, or ACREPOX Finish System.

c. Predecorated Gypsum Panels—for additional surface protection of predecorated TEXTONE Gypsum Panels, apply (one) (two) coat(s) of USG Polyurethane Clear Finish (Gloss) (Satin).

d. IMPERIAL QT Texture Finish

1. All surfaces, including joint compound applications, spackling or patching treatments, shall be dry, clean and sound. Remove any water-soluble materials from surface. Dull or roughen any glossy surfaces. Prime all metal surfaces with a rust-inhibitive oil primer. Fill and seal any exposed wood surfaces.

2. Allow new concrete ceilings and any new concrete patches or repairs to age at least 60 days before applying IMPERIAL QT Finish. Remove form oils, efflorescence, grease and other deposits from all concrete surfaces. Finish any patched or repaired areas to provide a uniform texture and surface. Grind down any ridges or other protrusions resulting from forms or other causes to the same level as adjacent surfaces; remove all grinding sludge or dust. If filling is required, apply DURABOND Joint Compound System (always overcoat with USG Ready-To-Use Joint Compound-All Purpose), COVER COAT Compound, USG Super Block Filler or R/M Smoothcoat and Texture. Apply in as many coats as are needed to provide a level, crack-free fill without edge joinings that show through decoration.

3. Exercise special care to provide a smooth level surface, free of irregularities, in areas which will be exposed to sharply angled lighting.

4. In drywall construction, treat joints and fastener heads with a joint system manufactured by the United States Gypsum Company, following manufacturer's instructions. Smooth and spackle any scratches or scuffis in drywall surfaces.

5. When all surfaces are prepared and dry, apply a full coat of PRO-KYD Alkyd Flat Paint or USG Vinyl Sealer. Allow to dry.

6. Mix IMPERIAL QT Texture Finish with water only as directed by manufacturer. Use spray equipment of a size and type to assure acceptable results. Apply by spray only at a coverage rate not to exceed 8 sq. ft. per lb. and in accordance with directions printed on container. Apply material to blend uniformly and cover fully without starved spots or other evidence of thin application. Provide uniform texture without application patterns. Remove any texture droppings or overspray from walls, windows and floor, leaving room clean for following trades.

e. FIRECODE 20 Classified Fire Hazard Coating

Note to architect: Application of FIRECODE 20 at a rate of 80-100 sq. ft. per gal. provides a wet thickness of 16-20 mils. Application at 170-180 sq. ft. per gal. rate provides a wet thickness of 8-10 mils. Airless spray is normal method of application; sufficient thickness may also be obtained in two or three coats using roller application. FIRECODE 20 Coating is supplied white but may be tinted with any USG Paint Colorant in the pastel or "P" range. Normally used as provided in the can. Thin, if desired, with small amount of water.

f. ACREPOX Finish

Note to architect: Application of ACREPOX Enamel at a rate between 350-400 sq. ft. per blended gallon provides a dry film thickness of approximately 5 mils per coat applied. Over masonry and ferrous metal (excluding aluminum), ACREPOX Epoxy Primer should

be used at dry film thickness of about 2-3 mils, developed by application of 275-400 sq. ft. per blended gallon. On masonry, concrete block and similar rough surfaces, USG Super Block Filler is used as a base coat under ACREPOX Enamel; when each coat of enamel is thereafter applied at a rate of 350-400 sq. ft. per blended gallon, a wet film thickness of 4 to 5 mils is developed. For tested performance characteristics of ACREPOX Finish, request U.S.G. Data Sheet T-1113.

1. As indicated in the respective sections, gypsum panels, concrete and cinder blocks, poured concrete walls and ceilings, plaster, asbestos board, masonry, hardboard, plywood interior and exterior surfaces shall be coated as specified.

2. Attempt application only when the interior temperature can be continually maintained in a uniform range above 50°F. for a minimum of 24 hours before, during and after application, and when exterior surfaces and air temperature will remain above 50°F. Strong drafts are to be avoided during application, but adequate ventilation must be provided during application, and for at least 24 hours after application is completed. When there has been rain or snow for several days before, during and after application, then the period of ventilation shall be extended to at least 72 hours after application.

3. *Concrete, Concrete Block and Brick*—remove protruding mortar, droppings, spatters, repair blemishes. Prime with blended ACREPOX Epoxy Primer or apply USG Super Block Filler in one or two full coats. Follow with ACREPOX Enamel in two, or preferably three, coats. Allow drying period between each coat per manufacturer's directions.

4. *Metal*—sand-blast or wire-brush to bright appearance, remove all oil and grease. Prime rust-free metal with ACREPOX Epoxy Primer. Follow with activated ACREPOX Enamel.

5. *Gypsum Panels*—joint and nailhead treatments must be thoroughly dry. Remove all dust, other foreign matter. Follow with two coats of ACREPOX Enamel; allow adequate curing time between coats. (USG Vinyl Sealer or Penetrating Sealer may be used as first coat.)

6. *Hardboards, Cement-Asbestos Boards*—surfaces must be clean and dry prior to application of ACREPOX Enamel.

7. *Plaster*—surfaces must be clean and dry. Meter reading must show not more than 6% residual moisture. Apply USG Penetrating Sealer on unpainted lime putty surfaces; follow with ACREPOX Enamel.

8. *Wood*—sand smooth, dust clean prior to application of ACREPOX Enamel. Thin first coat slightly with ACREPOX Thinner; sand lightly between coats.

9. *Previously Painted Surfaces*—after cleaning, test blended ACREPOX Enamel on small area to determine compatibility

with old coating. No lifting of old paint shall occur. If lifting appears, remove old coating and treat as new surface prior to application of ACREPOX Enamel.

10. *Smooth, Non-porous Surfaces*—apply two or more coats of ACREPOX Enamel, allowing drying period between coats of at least 48 hours.

g. Metal Surfaces

1. Flow on METAL COAT (Iron Oxide) (Zinc Chromate) (Zinc Dust) Primer in full uniform coat. Provide ample circulating ventilation during and after application.

2. Apply METAL COAT Enamel by (brush) (roller) (spray).

h. *Acoustical Tile, Panels and Plasters*—paint acoustical ceilings only after surfaces have been properly vacuum cleaned. Spray-apply USG Vinyl Wall Paint or GRAND PRIZE Latex Semi-Gloss Enamel in white or light tint as specified. Thin with water prior to spraying. Use standard spray atomizing equipment with sufficient fluid and pressure for light uniform coverage. Avoid piling up paint at laps, joinings, or elsewhere. Dust paint in alternating fashion from both sides of raised texture.

i. *Radiant Heat Ceilings*—after sealer coat of TEXOLITE Primer-Sealer has dried, apply () finish coats of GRAND PRIZE Latex Wall Paint. With installations employing RED TOP Radiant Heat Plaster or SHEETROCK R.H. Filler, de-energize heating cable for at least 6 hours prior to painting and until paint is dry.

j. *Poured Gypsum Roof Decks*—in finishing the underside of USG formboards supporting poured gypsum roof decks, a breathing type paint film and fortification against mildew are required. On all formboard types except mineral fiber and asbestos-cement, apply TAL Latex Wall Paint, reinforced by job-site addition of fungicide. On mineral fiber types, apply 1 or 2 coats PRO-KYD Alkyd Flat Wall Paint with fungicide. On asbestos-cement formboard, apply GRAND PRIZE One-Coat Latex House Paint; additional inhibitors not required.

k. *Precast Gypsum Roof Decks*—before painting, USG Metal Edge Gypsum Plank must be dry and galvanized edging must be free of grease or oil. Paint edging with METAL COAT Zinc Chromate Primer; seal gypsum surfaces with SHEETROCK Sealer. Allow metal primer and sealer to dry. Apply 1 or 2 coats GRAND PRIZE Latex Wall Paint or PRO-KYD Alkyd Flat Wall Paint.

l. *Water Storage Tanks*—in coating inside of tanks, surfaces must be free of rust, grease, oil, grit, or any foreign matter; bright metal should be sand-blasted. Apply one coat ACREPOX Epoxy Primer to wet film thickness of 4 to 5 mils. Then apply two coats of ACREPOX Enamel to wet film thickness of 4 to 5 mils, with overnight drying between all coats. Apply to full, complete, continuous film. Before immersion, allow minimum of 7 days curing time if temperature is above 70°F., or 14 days if between 50°F. and 70°F.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, TEXOLITE, GRAND PRIZE, DIAMOND, PRO-KYD, CEMENTICO, FIRECODE, DURACAL, IMPERIAL, TEXTONE, TAL, A-B TEX, METAL COAT, ACREPOX, SHEETROCK, PERF-A-TAPE, DURABOND, RED TOP, IMPERIAL, COVER COAT.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information. U.S.G. SALES OFFICES, PAINT DIVISION: **ILLINOIS:** Chicago, 321-5714 • **NEW YORK:** New York City, 247-6091 • **TENNESSEE:** Nashville, 292-6653 • **TEXAS:** Dallas, 357-6469.

•USG

MULTI-PURPOSE TEXTURE FINISH

1



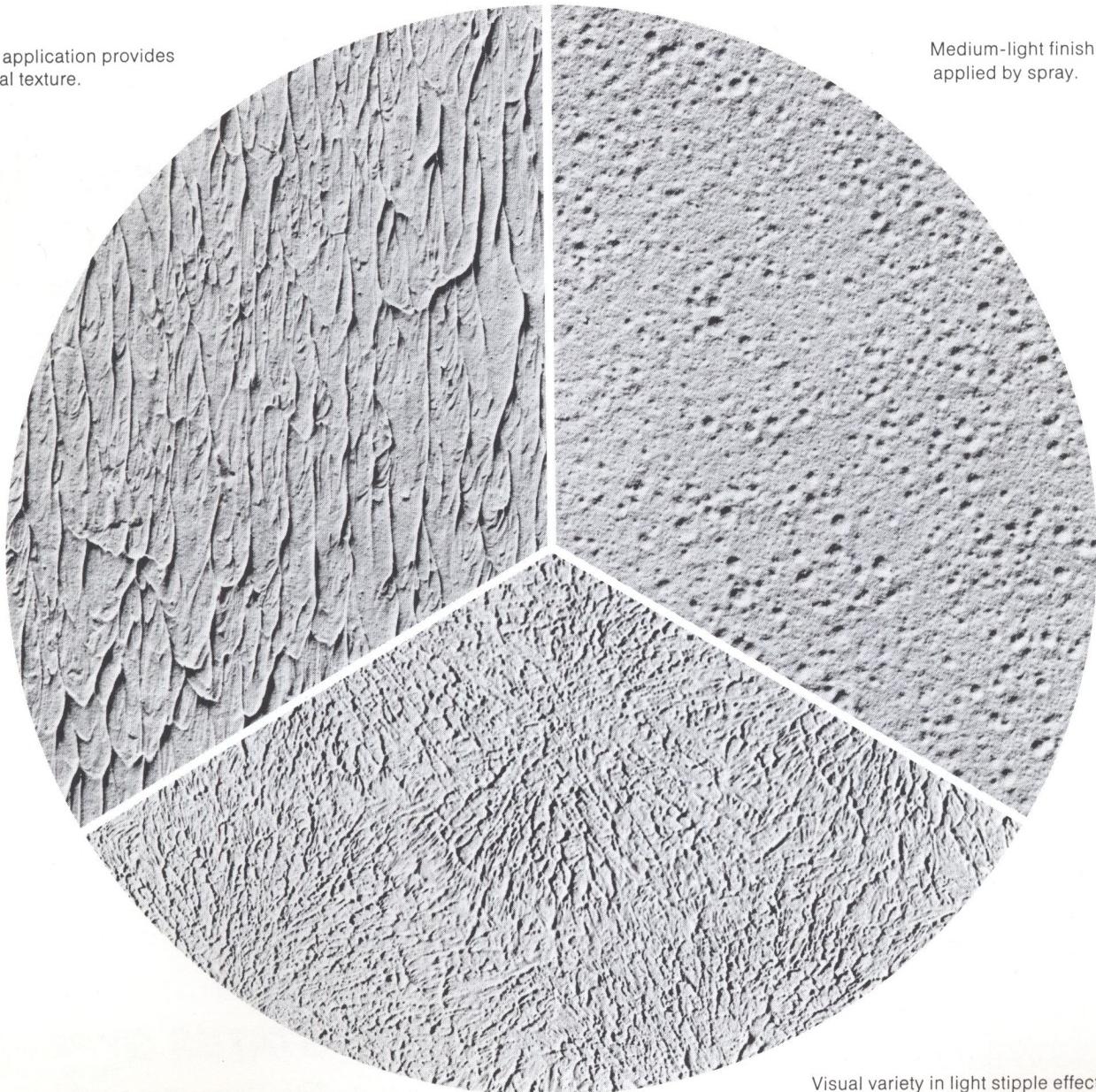
For artistic variety of light texture effects on new drywall interiors

- Conceals minor defects in walls, ceilings
- Safe, non-asbestos powder formulation—easily mixed
- Brush, roller or spray application
- Excellent coverage—dries fast to hard finish

Description

USG Multi-Purpose Texture Finish is an economical, unaggregated, non-asbestos powder product, to be mixed with water for desired texturing consistency. Excellent for producing a variety of light to medium-light textures on drywall or other interior surfaces. Textured effect obtained by brush, roller or spray application. Helps conceal minor surface defects; dries to a sparkling white finish usually overpainted on walls, can be left unpainted on ceilings.

Roller application provides unusual texture.



Visual variety in light stipple effect.

USG MULTI-PURPOSE TEXTURE FINISH

Advantages

Safe and versatile. Non-asbestos powder formulation mixes easily with water for safe, low-cost application. No special equipment needed, can be used on most interior surfaces.

Variety of finish effects. Creative designs can be varied with use of different tools; offer many possibilities in decorative textures and patterns.

Hides imperfections. Unique texture pattern provides an attractive finish plus concealment for cracked, discolored and damaged surfaces.

Dries fast for decoration. Dries to a hard, white finish ready for next-day decoration. Ceilings can be left unpainted if surface is completely covered.

Limitation

Application below grade or in high-humidity areas not recommended.

DIRECTIONS

Preparation: All surfaces must be dry, clean and sound. Dull glossy surfaces; prime metal with METAL COAT Zinc Chromate Primer. Fill and seal wood surfaces. New concrete should age 60 days or more before covering. Remove form oils, grease, efflorescence. Fill or level with DURABOND Joint Compound, COVER COAT Drywall Compound or USG Super Block Filler. Treat drywall joints and nailheads with a U.S.G. joint compound. When all prepared surfaces are dry, apply TAL Vinyl Sealer or TAL Alkyd Flat Wall Paint over entire surface.

Mixing: Use a clean mixing vessel equipped with variable-speed power agitator. In initial mix, stir 25 lb. powder into 2 gal. water. Agitate and stir until creamy, lump-free mix is obtained, then stir in up to 1 gal. water. To obtain suitable consistency for texturing as desired, do not use more than 3 gal. water per 25 lb. powder. Do not overthin as poor adhesion, lack of hide and texture variation may result. Do not intermix with other materials.

Application: Apply with brush, roller or suitable spray equipment, then texture with roller or other tool. For finer textures and designs, use small brush, roller-stippler, the fingers, whisk broom, crumpled paper, comb or similar items. Flattening raised portions of wet material or sanding when dry provides further variation. May be scored to represent block, tile or cut stone outlines. Provide min. 55°F. air and structural temperature during and after application. Avoid drafts while applying but provide ventilation after application to aid drying. Do not use unvented gas or oil heaters. May be painted after overnight drying. Ceilings may be left unpainted.

ARCHITECTURAL SPECIFICATIONS

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be applied in accordance with its current printed directions.

1.3 submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials, which, when approved, shall be the standards of finish to be provided on this project.

1.4 delivery and storage of materials

a. All materials shall be delivered in their original containers bearing the manufacturer's name, brand name and directions for use.

b. All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 environmental conditions

During cold weather, provide thermostatically controlled heat to maintain 55°F. temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used. Provide adequate ventilation at all times for proper drying.

Part 2: products

2.1 materials

(Specify surface treatment and finish materials from application directions.)

Part 3: execution

3.1 surface preparation

Before applying, prepare surfaces as required in product directions. The base surface must be sound, firm and dry, clean and free of dust, dirt, grease or other foreign material (see Specifications in U.S.G. Folder SA-933).

3.2 application

Apply finishes according to product directions. Finishes must be evenly spread and free from runs, sags and other blemishes. Allow all coats to dry before applying following coats.

PRODUCT DATA

Binder: Vinyl.

Priming: TAL Alkyd Flat Paint or TAL Vinyl Sealer; METAL COAT Zinc Chromate Primer for metal.

Thinning: Water.

Drying Time: Dries to touch in 1 to 2 hrs. Let dry before painting.

Color: White; overpainting recommended

Coverage: 10 to 20 sq. ft. per lb. depending on texture desired.

Storage: Close opened bags as airtight as possible and store in dry place.

Packaging

25-lb. bags.

Precautions

If mixing or otherwise working in a dusty atmosphere containing this material, ventilate, use dust collector, or wear eye protection and a respirator approved by the Bureau of Mines, or equivalent, to remove dust.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, METAL COAT, TAL, DURABOND, COVER COAT.

UNITED STATES GYPSUM
BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

USG

SPRAY TEXTURE FINISH



2

For a variety of light, appealing textures in interiors

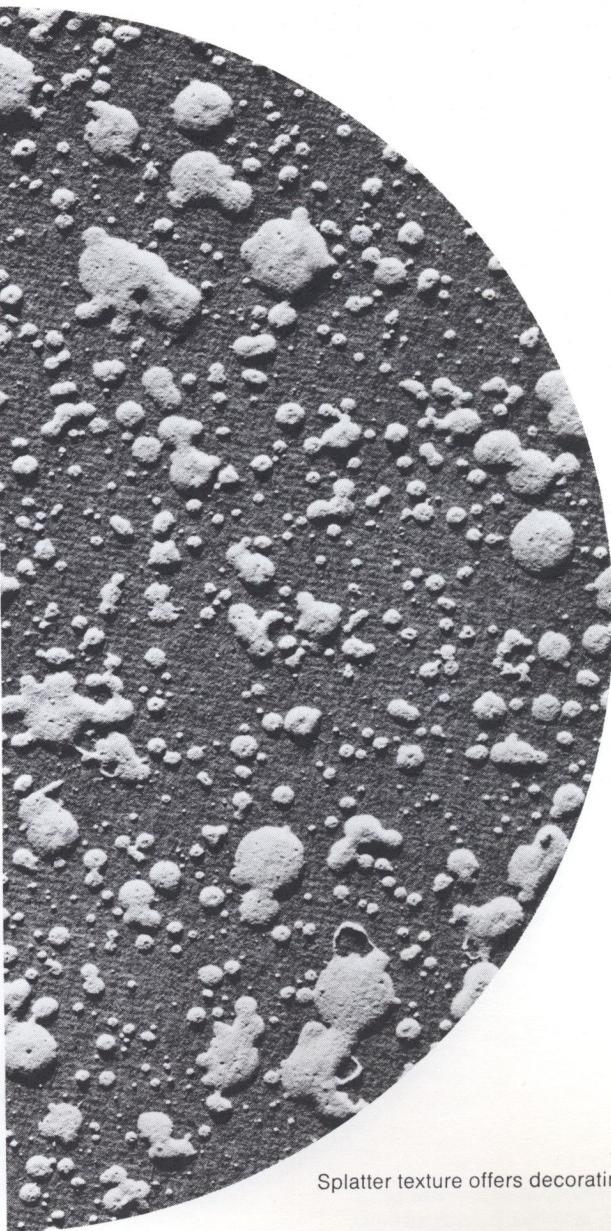
- For most interior wall and ceiling surfaces
- Superior coverage—fast drying
- Good concealment—excellent hardness
- Non-asbestos powder formulation—aggregated or unaggregated
- Spray, brush or roller application

Description

USG Spray Texture Finish is a top-performance product available in aggregated and unaggregated forms. Ideal for texture variety on gypsum panels and most other interior wall surfaces. Produces interesting effects such as light splatter and fog-and-splatter finishes with machine; light "orange peel" texture with roller. Color matches that of U.S.G. ceiling texture products, thus eliminates touch-up of overspray on finished ceilings. A noncasein product, it stays mixed—can be held in mixing tanks without spoilage. Non-asbestos formulation provides safe mixing and application conditions. Superior wet and dry bond assures good holdout of finish film over dry joints, minimizes costly callbacks. Often applied in two coats with second coat producing texture such as fog-and-splatter finish. Dries to a soft white surface with good concealment. Should be overpainted when dry.



Soft texture finish, rapidly spray-applied.



Splatter texture offers decorating variety.

USG SPRAY TEXTURE FINISH

Advantages

Safe and easy to mix and use. Mixes easily with cold water; special non-asbestos formulation for safe application. Variety of textures obtained with simple equipment.

For most interior surfaces. Ideal for use on gypsum drywall, plaster, concrete, concrete block.

Unique decorating effects. Can dramatize rooms with matching or contrasting textures on walls and ceiling.

Durable, low-cost application. Made for spray coating but can be brushed or rolled. Conceals unsightly surface cracks and blemishes. Takes standard decoration.

Limitation

Application below grade or in high-humidity areas not recommended.

DIRECTIONS

Preparation: All surfaces must be dry, clean and sound. Dull glossy surfaces; prime metal with METAL COAT Zinc Chromate Primer. Fill and seal wood surfaces. New concrete should age 60 days or more before covering. Remove form oils, grease, efflorescence. Grind down plane differences and remove grinding dust and sludge. Fill or level with DURABOND Joint Compound, COVER COAT Drywall Compound or USG Super Block Filler. Reinforce and conceal drywall joints using PERF-A-TAPE Reinforcing Tape and a U.S.G. joint compound. Fill all fastener depressions with joint compound. Smooth surface scratches and scuffs. Correct plane irregularities, as these are accentuated by sharp, angular lighting. When prepared surfaces are dry, apply TAL Vinyl Sealer or TAL Alkyd Flat Wall Paint over entire surface.

Mixing: Use a clean vessel equipped with variable-speed power agitator. In initial mix, stir 25 lb. powder into 2 to 2½ gal. water, agitating during powder addition. Stir until a creamy, lump-free mix is obtained. Adjust spray consistency by adding small amounts of powder or water. Do not overthin, as poor adhesion, lack of hide and texture variation may result.

Application: Apply with spray using 16- to 20-in. fan. Hold gun 16 to 18 in. from surface. Overlap preceding application with ½ to ⅔ of fan width. With 75 to 125 ft. of ½-in. hose use 30 to 40 lb. fluid pressure and 50 to 60 lb. atomizing pressure. Provide min. 55°F. air and structural temperature during and for several hours after application. Avoid drafts while spraying, then provide ventilation to aid drying.

Use equipment similar to Binks No. 18D gun with 53-R-21 nozzle combination, ½-in. fluid hose, ⅜-in. air hose, air-powered 4-to-1 ratio materials pump with double regulators, ½-in. main line air hose and 7½- to 9-hp gasoline compressor.

ARCHITECTURAL SPECIFICATIONS

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be applied in accordance with its current printed directions.

1.3 submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials, which, when approved shall be the standards of finish to be provided on this project.

1.4 delivery and storage of materials

a. All materials shall be delivered in their original containers bearing the manufacturer's name, brand name and directions for use.

b. All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 environmental conditions

During cold weather, provide thermostatically controlled heat to maintain 55°F. temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used. Provide adequate ventilation at all times for proper drying.

Part 2: products

2.1 materials

(Specify surface treatment and finish materials from product directions.)

Part 3: execution

3.1 surface preparation

Before applying, prepare surfaces as required in product directions. The base surface must be sound, firm and dry, clean and free of dust, dirt, grease or other foreign material (see Specifications in U.S.G. Folder SA-933).

3.2 application

Apply finishes according to product directions. Finishes must be evenly spread and free from runs, sags and other blemishes. Allow all coats to dry before applying following coats.

PRODUCT DATA

Binder: Amylum.

Aggregate: Perlite. Also unaggregated.

Thinning: Water.

Tinting: Not recommended. Usually overpainted.

Drying Time: Dries to touch in 1 to 2 hrs. Let dry before painting.

Color: White; overpainting recommended.

Coverage: Up to 50 sq. ft. per lb. for walls; should not exceed 20 sq. ft. per lb. on ceilings.

Storage: Close opened bags as airtight as possible and store in dry place.

Packaging

25- and 50-lb. bags.

Precautions

When mixing or otherwise working in a dusty atmosphere containing this material, ventilate, use dust collector, or wear eye protection and a respirator approved by the Bureau of Mines, or equivalent, to remove dust.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, METAL COAT, DURABOND, COVER COAT, TAL.

UNITED STATES GYPSUM

BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606



TEXTURE XII DRYWALL SURFACER

3



For beautiful sand-finish plaster effect or super-smooth finish on interior drywall surfaces

- Conceals minor surface defects in walls and ceilings
- Non-asbestos powder formulation—mixes quickly
- Designed for fast, low-cost spray application
- Aggregated or unaggregated—excellent coverage, fast drying

Description

USG Texture XII Drywall Surfacer is a non-asbestos white coating for spray application. Available in aggregated form to achieve a sand-finish effect; in unaggregated form for a smooth finish on interior gypsum panel surfaces. Conceals minor surface defects—provides a uniform texture with good hiding quality. Provides an excellent base for any latex- or oil-base paint, or can be left unpainted on ceilings.



Sand-effect texture finish is ideal for drywall surfaces. Spray application saves time, cuts costs.

UNITED STATES GYPSUM
1976-5



9 P PAINTING

interior preparations

USG TEXTURE XII DRYWALL SURFACER

Advantages

Safe to mix and use. Non-asbestos formulation eliminates many of the safety problems found in other products. Mixes easily with water; unused dry powder can be stored for future use.

Two types for choice of finish. Decorating variety with two types of textures to harmonize or contrast with adjacent smooth areas.

Low-cost spray application. Rapid, easy application cuts costs, provides uniform coverage.

Fast drying, excellent hide. Dries in an hour to a hard, dense finish.

Limitations

Wall applications are always overpainted. Ceilings are usually painted but with proper application, may be left unpainted.

DIRECTIONS

Preparation: All surfaces must be dry, clean and sound. To prepare surfaces, reinforce and conceal drywall joints using PERF-A-TAPE Reinforcing Tape and a U.S.G. joint compound. Fill all fastener depressions with joint compound. Smooth, level, feather-out or fill scratches, gouges, humped or hollow joint treatment. Allow repair to dry thoroughly. Remove water-soluble materials. Dull glossy painted surfaces. Prime metal surfaces with METAL COAT Zinc Chromate Primer. Fill and seal wood surfaces. When all prepared surfaces are dry and free of dust, apply TAL Vinyl Sealer or TAL Alkyd Flat Wall Paint over entire surface.

Mixing: Place 2½ gal. of water per 25 lbs. Texture XII in suitable mixing container. Gradually add powder to water. Stir thoroughly with mechanical mixer until completely mixed and lump-free. Soak mix for 30 min., stir again. Use within 24 hrs. Up to ½ gal. more water per bag may be added to reach desirable spraying consistency. Overthinning may result in poor adhesion, lack of hide, texture variation and inability to compensate for base suction variations. *Do not exceed 3 gal. total water per bag.*

Application—Walls: Apply with spray gun using 24-in. fan. Hold gun 18 in. from surface and move parallel to surface. Avoid curved, sweeping strokes. Overlap preceding application with ½ to ⅔ of fan width. Do not exceed 35 sq. ft. coverage per lb. of Texture XII Surfacer. Use ½-in. fluid hose with fluid-pressure variable depending on material hose-length. Air and surface temperatures should be 55°F. (10°C.) or higher during, and for several hours after, application. Avoid drafts while applying; then provide adequate circulating ventilation to aid drying.

Application—Ceilings: Apply a full coat in one direction, then immediately cross-spray in opposite direction. Apply Texture XII Drywall Surfacer at rate of approx. 20 sq. ft. per lb. Application to extend coverage accentuates suction or other differences in surface being coated and may require additional coats of Texture XII Surfacer. Material dries to touch in approx. 60 min.; allow to dry overnight before applying another coat.

The following spray equipment produces excellent results: Hackel Bros. (Milwaukee, Wisc.) Model 18 or 18D special with #68 stainless-steel fluid nozzle, orifice size .110; air nozzle #101 carbide; atomizing pressure at gun 40-50 psi; air-hose size ⅜ in. i.d. with ⅛-in. swivel; fluid-hose size ½ in. i.d. with ½-in. swivel; control-hose size 3/16 in. with ¼-in. swivel. Air-driven pump sizes: 4½:1 ratio for hose lengths up to 125 ft.; 7½:1 for lengths up to 200 ft.; 10:1 for lengths over 200 ft.

ARCHITECTURAL SPECIFICATIONS

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be applied in accordance with its current printed directions.

1.3 submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials, which, when approved shall be the standards of finish to be provided on this project.

1.4 delivery and storage of materials

a. All materials shall be delivered in their original containers bearing the manufacturer's name, brand name and directions for use.

b. All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 environmental conditions

During cold weather, provide thermostatically controlled heat to maintain 55°F. temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used. Provide adequate ventilation at all times for proper drying.

Part 2: products

2.1 materials

(Specify surface treatment and finish materials from application directions.)

Part 3: execution

3.1 surface preparation

a. Before applying, prepare surfaces as required in product directions. The base surface must be sound, firm and dry, clean and free of dust, dirt, grease or other foreign material.

b. Interior gypsum panel surfaces—prepare joints and fastener heads with (USG) (DURABOND) Joint Compound (see Specifications in U.S.G. Folder SA-927).

3.2 application

Apply finishes according to product directions. Finishes must be evenly spread and free from runs, sags and other blemishes. Allow all coats to dry before applying following coats.

PRODUCT DATA

Binder: Vinyl.

Aggregate: Perlite.

Priming: TAL Alkyd Flat Paint or TAL Vinyl Sealer; METAL COAT Zinc Chromate Primer for metal.

Thinning: Water.

Drying Time: Dries to touch in approx. 60 min. Let dry before recoating.

Color: White; may be painted after drying if desired.

Coverage: Up to 35 sq. ft. per lb. on walls; up to 20 sq. ft. on ceilings.

Storage: Close opened bags as airtight as possible and store in dry place.

Packaging
25-lb. bags.

Precautions

If mixing or otherwise working in a dusty atmosphere containing this material, ventilate, use dust collector, or wear eye protection and a respirator approved by the Bureau of Mines, or equivalent, to remove dust.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, PERF-A-TAPE, METAL COAT, TAL, DURABOND.

UNITED STATES GYPSUM

BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

IMPERIAL QT

TEXTURE FINISH
(P—Regular) (PC—Coarse)



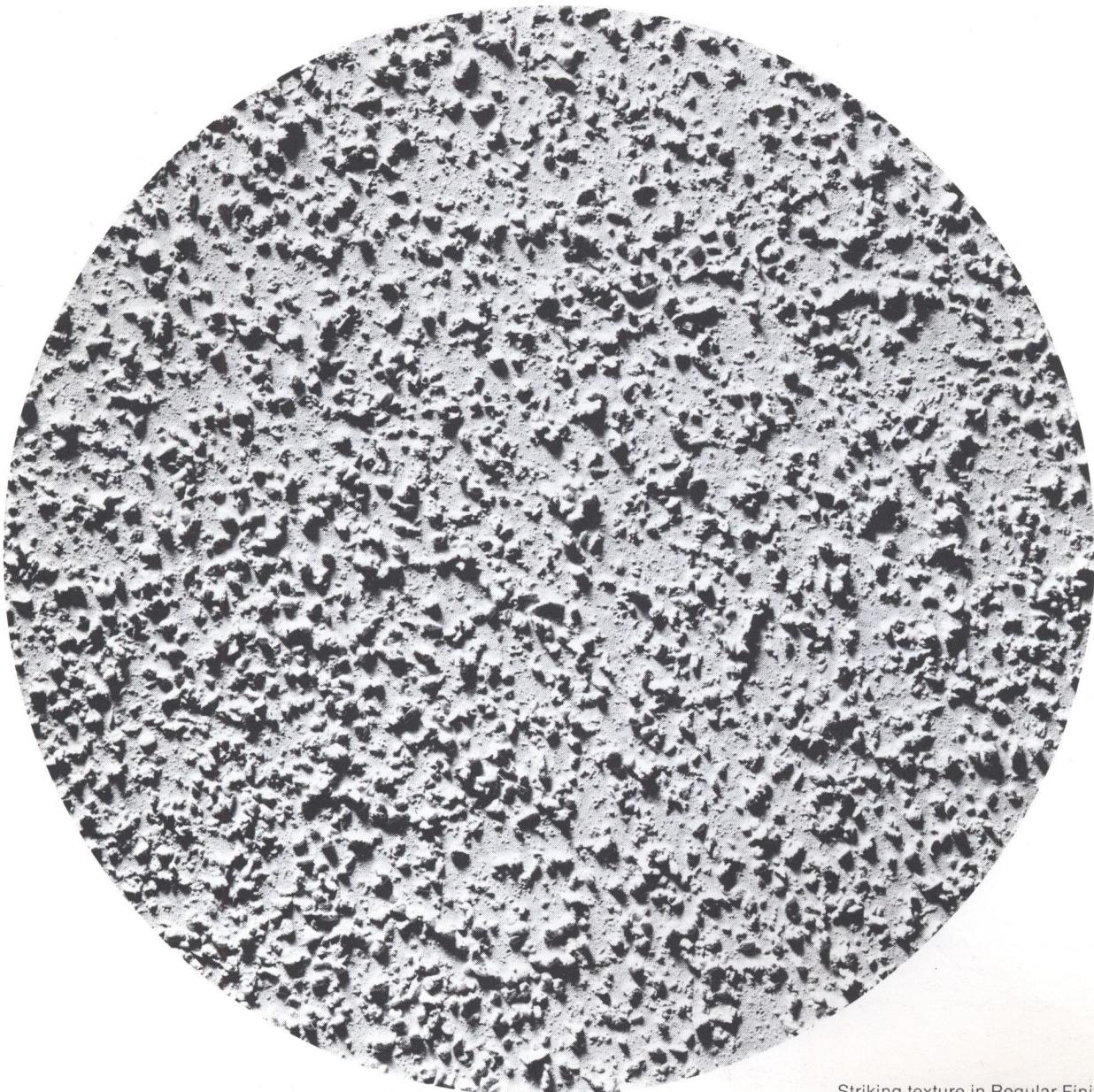
4

For striking acoustical appearance
on interior ceilings

- Two high-style, visually interesting textures
- Exceptionally white color—hides minor surface defects
- Fast pumping, low-cost spray application
- Non-asbestos powder formulation—easily mixed

Description

IMPERIAL QT Texture Finish, a non-asbestos powder product with polystyrene aggregate, is available in medium or coarse textures for decorating variety. Produces a handsome simulated acoustical ceiling finish but with no acoustical correction. Requires only addition of water at job site. No soaking period or extended mixing even with cold water. Produces excellent bonding qualities for application to gypsum panels, concrete, plaster or wood. High wet- and dry-hide masks minor surface defects for impressive monolithic effect. Dries to exceptional whiteness, usually left unpainted but may be overpainted if desired.



Striking texture in Regular Finish.

UNITED STATES GYPSUM
1976—5
 9 P PAINTING
interior preparations

IMPERIAL QT TEXTURE FINISH—REGULAR & COARSE

Advantages

Variety and beauty. Two interesting textures allow choice of finish to match decorating schemes. Bright, white surface helps make rooms cheerful.

Easy to mix, safe to apply. Mixed with water just before use, this non-asbestos formulation is spray-applied with standard equipment for fast, uniform coverage.

Decorates and conceals. Ideal for new construction; also makes old ceilings look like new. Covers minor surface cracks and blemishes.

Dries fast for quick completion. Shortens construction time reduces overall costs, speeds occupancy.

Limitation

Application below grade or in high-humidity areas not recommended.

DIRECTIONS

Preparation: All surfaces must be dry, clean and sound. Dull glossy surfaces; prime metal with METAL COAT Zinc Chromate Primer. Fill and seal wood surfaces. New concrete should age 60 days or more before covering. Remove form oils, grease, efflorescence. Grind down plane differences and remove grinding dust and sludge. Fill or level with DURABOND Joint Compound, COVER COAT Drywall Compound or USG Super Block Filler. Reinforce and conceal drywall joints using PERF-A-TAPE Reinforcing Tape and a U.S.G. joint compound. Fill all fastener depressions with joint compound. Smooth surface scratches and scuffs. Correct plane irregularities, as these are accentuated by sharp, angular lighting. When prepared surfaces are dry and free of dust, apply TAL Vinyl Sealer or TAL Alkyd Flat Wall Paint over entire surface.

Mixing: Use clean vessel equipped with variable-speed power agitator. Sift each 32-lb. bag of Finish into 5 to 8½ gal. water (per directions on bag), agitating water during powder addition. Stir until a creamy (but aggregated) lump-free mix is obtained. Adjust spray consistency by adding small amounts of powder or water. Do not overthin, as poor adhesion, lack of hide and texture variation may result. Do not intermix with other materials.

Application: Use spray equipment similar to Grover 452-A 10-to-1 ratio, double-action pump with 7½-in. stroke, equipped with a 4-ft. pole gun having ⅜- to ½-in. round orifice, or Binks 7-E-2 hand gun with ⅜-in. round opening. Use ¾- to 1-in. material hose, ⅜-in. atomizing hose and ½-in. air line from compressor to pump. Compressor must be adequate (85 cfm) for length and size of hose. Keep pressure as low as possible. Plaster mixers or hopper-type applicators also may be used.

Apply at rate of 6 to 10 sq. ft. per lb. Do not exceed recommended coverage, as subsurface defects, variations in base suction or color differences may show through, or lighter texture may result.

Surfaces with uneven suction may require two coats. Let first coat dry before applying second. Remove splatters immediately from woodwork and trim. Provide 55°F. air and structural temperature during and after application. Do not use unvented gas or oil heaters. Avoid drafts while applying, but provide adequate circulating ventilation to aid drying. For comfort, use a respirator and protect eyes.

ARCHITECTURAL SPECIFICATIONS

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be applied in accordance with its current printed directions.

1.3 submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials, which, when approved shall be the standards of finish to be provided on this project.

1.4 delivery and storage of materials

a. All materials shall be delivered in their original containers bearing the manufacturer's name, brand name and directions for use.

b. All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 environmental conditions

During cold weather, provide thermostatically controlled heat to maintain 55°F. temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used. Provide adequate ventilation at all times for proper drying.

Part 2: products

2.1 materials

(Specify surface treatment and finish materials from application directions.)

Part 3: execution

3.1 surface preparation

Before applying, prepare surfaces as required in product directions. The base surface must be sound, firm and dry, clean and free of dust, dirt, grease or other foreign material (see Specifications in U.S.G. Folder SA-933).

3.2 application

Apply finishes according to product directions. Finishes must be evenly spread and free from runs, sags and other blemishes. Allow all coats to dry before applying following coats.

PRODUCT DATA

Binder: Amylum.

Aggregate: Polystyrene.

Thinning: Water.

Tinting: Not recommended. Usually overpainted.

Drying Time: Dries to touch in 30 to 60 min. Let dry before recoating.

Color: Bright white; may be spray-painted if desired after drying.

Coverage: Up to 10 sq. ft. per lb.

Storage: Close opened bags as airtight as possible and store in dry place.

Packaging
32-lb. bags.

Precautions

When mixing or otherwise working in a dusty atmosphere containing this material, ventilate, use dust collector, or wear eye protection and a respirator approved by the Bureau of Mines, or equivalent, to remove dust.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, IMPERIAL, METAL COAT, DURABOND, PERF-A-TAPE, COVER COAT, TAL.

UNITED STATES GYPSUM

BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

IMPERIAL QT

TEXTURE FINISH
(LCNC—Fine)

5



For finishing interior ceilings with attractive sand-finish texture

- Subtle, simulated acoustical plaster appearance
- Excellent coverage with exceptionally white color
- Spray-applied with strong bond to most surfaces
- Non-asbestos powder formulation—mixes quickly

Description

IMPERIAL QT Texture Finish—LCNC is a non-asbestos product formulated with perlite aggregate to produce a rich acoustical appearance on ceilings. Provides no acoustical correction. Remarkable bonding qualities allow its use over many surfaces—new or old concrete, gypsum panels, plaster, wood, even metal pipes. In powder form, easily mixed with water. Requires no soaking period—once mixed, stays mixed. Spray-applied for fast, low-cost coverage. Good pumpability with minimum fallout. Conceals minor surface defects. Dries to a hard, white finish that can be painted.



Fast spray application with low-cost formulation produces pleasing texture finish.

IMPERIAL QT TEXTURE FINISH—LCNC-FINE

Advantages

Easy to mix, safe to use. Powder product is quickly mixed with water to proper consistency. Non-asbestos formulation helps meet OSHA safety requirements. Unused powder can be stored for future use.

Saves time and money. Low-cost spray application reduces job time. Allows earlier occupancy, faster return on investment.

Reduces application problems. IMPERIAL QT Texture Finish matches U.S.G. wall texture finishes to minimize overspray problems on walls. Protects job appearance, reduces callbacks.

Decorates, conceals imperfections. High-hide texture brightens rooms, can be painted to match any decorating scheme. Also conceals most minor surface imperfections that usually must be corrected.

Limitation

Application below grade or in high-humidity areas not recommended.

DIRECTIONS

Preparation: All surfaces must be dry, clean and sound. Dull glossy surfaces; prime metal with METAL COAT Zinc Chromate Primer. Fill and seal wood surfaces. New concrete should age 60 days or more before covering. Remove form oils, grease, efflorescence. Grind down plane differences and remove grinding dust and sludge. Fill or level with DURABOND Joint Compound, COVER COAT Drywall Compound or USG Super Block Filler. Reinforce and conceal drywall joints using PERF-A-TAPE Reinforcing Tape and a U.S.G. joint compound. Fill all fastener depressions with joint compound. Smooth surface scratches and scuffs. Correct plane irregularities, as these are accentuated by sharp, angular lighting. When prepared surfaces are dry and free of dust, apply TAL Vinyl Sealer or TAL Alkyd Flat Wall Paint over entire surface.

Mixing: Use clean vessel equipped with variable-speed power agitator. Sift each 40-lb. bag of Finish into 7 or 8 gal. water, agitating water during powder addition. Stir until a creamy (but aggregated) lump-free mix is obtained. Adjust spray consistency by adding small amounts of powder or water. Do not overthin, as poor adhesion, lack of hide and texture variation may result. Do not intermix with other materials.

Application: Use spray equipment similar to Grover 452-A 10-to-1 ratio, double-action pump with 7½-in. stroke, equipped with 4-ft. pole gun having ¾- to ½-in. round orifice, or Binks 7-E-2 hand gun with ¾-in. round opening. Use ¾- to 1-in. material hose, ¾-in. atomizing hose and ½-in. air line from compressor to pump. Compressor must be adequate (85 cfm) for length and size of hose. Keep pressure as low as possible. Plaster mixers or hopper-type applicators also may be used.

Apply at a rate of 4 to 8 sq. ft. per lb. Do not exceed recommended coverage, as subsurface defects, variations in base suction or color differences may show through, or lighter texture may result. Surfaces with uneven suction may require two coats. Let first coat dry before applying second. Remove splatters immediately from woodwork and trim. Provide 55°F. air and structural temperature during and after application. Do not use unvented gas or oil heaters. Avoid drafts while applying, but provide circulating ventilation to aid drying. For comfort, use a respirator and protect eyes.

ARCHITECTURAL SPECIFICATIONS

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be applied in accordance with its current printed directions.

1.3 submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials, which, when approved shall be the standards of finish to be provided on this project.

1.4 delivery and storage of materials

a. All materials shall be delivered in their original containers bearing the manufacturer's name, brand name and directions for use.

b. All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 environmental conditions

During cold weather, provide thermostatically controlled heat to maintain 55°F. temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used. Provide adequate ventilation at all times for proper drying.

Part 2: products

2.1 materials

(Specify surface treatment and finish materials from application directions.)

Part 3: execution

3.1 surface preparation

Before applying, prepare surfaces as required in product directions. The base surface must be sound, firm and dry, clean and free of dust, dirt, grease or other foreign material (see Specifications in U.S.G. Folder SA-933).

3.2 application

Apply finishes according to product directions. Finishes must be evenly spread and free from runs, sags and other blemishes. Allow all coats to dry before applying following coats.

PRODUCT DATA

Binder: Amylum.

Aggregate: Perlite.

Thinning: Water.

Tinting: Not recommended. Usually overpainted.

Drying Time: Dries to touch in 30 to 60 min. Let dry before recoating.

Color: Brilliant white; may be spray-painted if desired after drying.

Coverage: Up to 8 sq. ft. per lb.

Storage: Close opened bags as airtight as possible and store in dry place.

Packaging

40-lb. bags.

Precautions

When mixing or otherwise working in a dusty atmosphere containing this material, ventilate, use dust collector, or wear eye protection and a respirator approved by the Bureau of Mines, or equivalent, to remove dust.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: IMPERIAL, METAL COAT, DURABOND, COVER COAT, PERF-A-TAPE, TAL.

UNITED STATES GYPSUM
BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

IMPERIAL QT

TEXTURE FINISH
(V—Regular) (VC—Coarse)

6

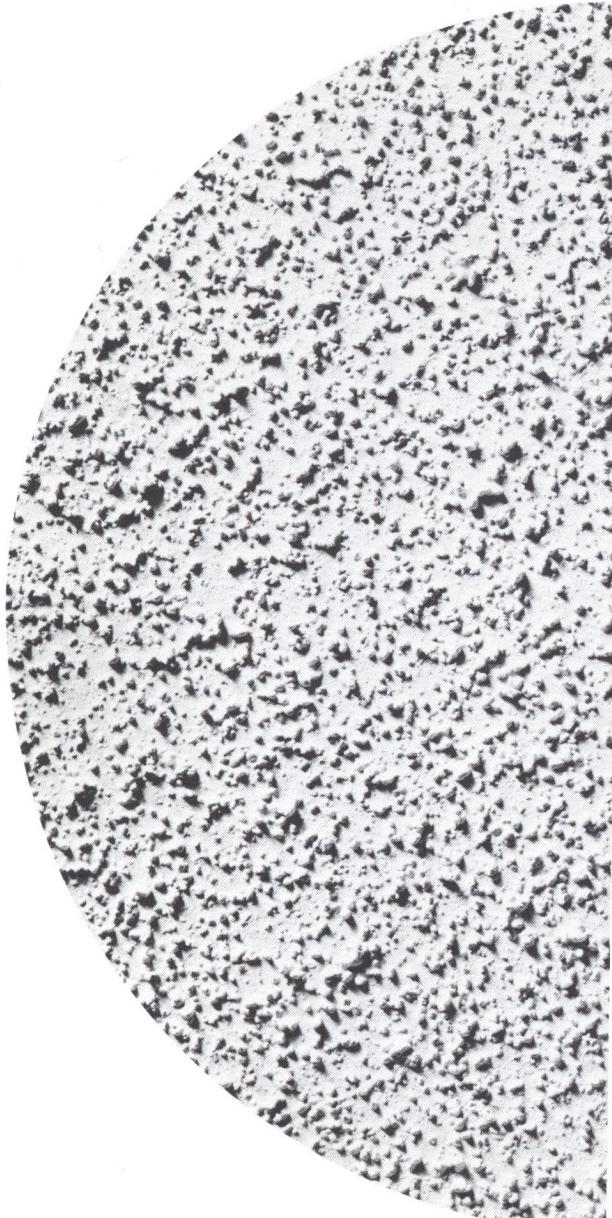


For finishing interior ceilings with attractive medium or heavy textures

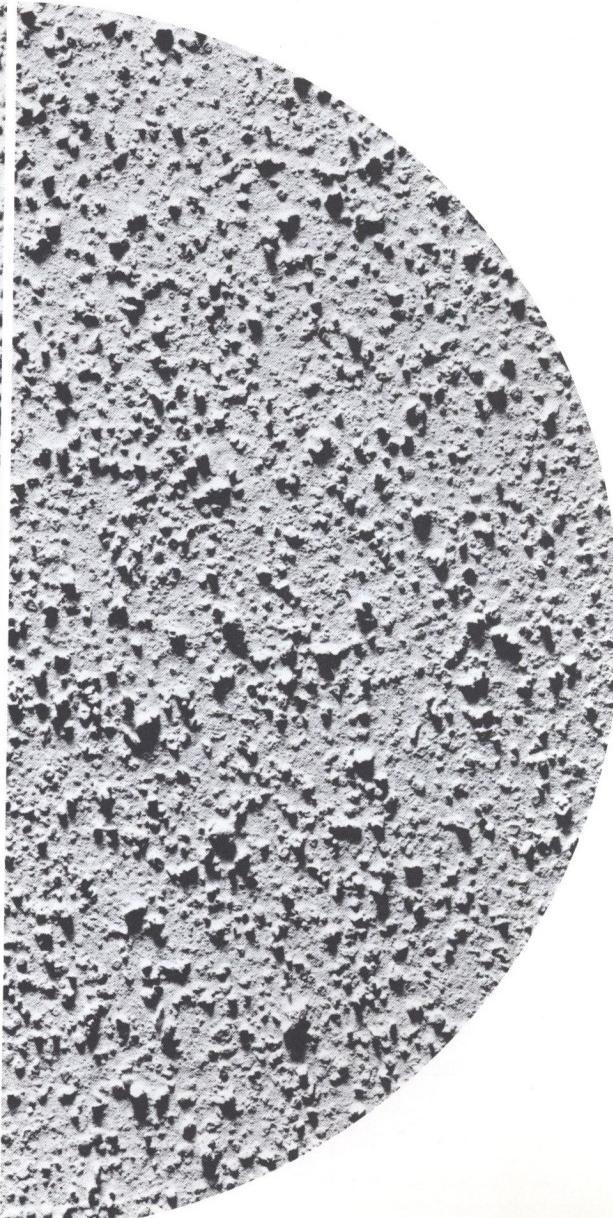
- Full-bodied, simulated acoustical plaster surface
- Non-asbestos powder formulation—mixes quickly
- Easy pumping for fast, safe spray application
- Excellent coverage—good hide with off-white color

Description

IMPERIAL QT Texture Finish is a non-asbestos, non-casein product formulated with regular or coarse vermiculite for a choice of beautiful medium- or heavy-texture ceiling surfaces. Produces no acoustical correction. Outstanding bond allows use over most interior surfaces—new or old concrete, gypsum panels, plaster, wood, and even metal pipes. Both types in powder form, easily mixed with water for application with standard spray equipment. Covers most minor surface defects, dries to a pleasing off-white surface that may be painted.



Handsome medium texture for subtle beauty.



Bold and rugged coarse texture for high contrast.

UNITED STATES GYPSUM
1976-5



9 P

PAINTING
Interior preparations

IMPERIAL QT TEXTURE FINISH—REGULAR & COARSE

Advantages

Choice of finishes. Two texture finishes allow decorating variety, improve sales appeal. Elegant textured surfaces offer attractive contrast with smooth-finish elements.

Economical and effective. Easy mixing plus rapid spray application provide money-saving advantages. No special techniques or equipment needed.

Compatible with wall finishes. IMPERIAL QT matches finishes of USG Spray Texture and Multi-Purpose Texture to provide a uniform system for sidewalls and ceilings.

Protects job appearance. Minimizes discoloration caused by overspray from ceilings, eliminates need for masking walls. Professional finish appearance reduces need for callbacks.

DIRECTIONS

Preparation: All surfaces must be dry, clean and sound. Dull glossy surfaces; prime metal with METAL COAT Zinc Chromate Primer. Fill and seal wood surfaces. New concrete should age 60 days or more before covering. Remove form oils, grease, efflorescence. Grind down plane differences and remove grinding dust and sludge. Fill or level with DURABOND Joint Compound, COVER COAT Drywall Compound or USG Super Block Filler. Reinforce and conceal drywall joints using PERF-A-TAPE Reinforcing Tape and a U.S.G. joint compound. Fill all fastener depressions with joint compound. Smooth surface scratches and scuffs. Correct plane irregularities, as these are accentuated by sharp, angular lighting. When prepared surfaces are dry and free of dust, apply TAL Vinyl Sealer or TAL Alkyd Flat Wall Paint over entire surface.

Mixing: Use clean vessel equipped with variable-speed power agitator. Sift each 40-lb. bag of Finish into 7 or 8 gal. water, agitating water during powder addition. Stir until a creamy (but aggregated) lump-free mix is obtained. Adjust spray consistency by adding small amounts of powder or water. Do not overthin, as poor adhesion, lack of hide and texture variation may result. Do not intermix with other materials.

Application: Use spray equipment similar to Grover 452-A 10-to-1 ratio, double-action pump with 7½-in. stroke, equipped with 4-ft. pole gun having ⅜- to ½-in. round orifice, or Binks 7-E-2 hand gun with ⅜-in. round opening. Use ¾- to 1-in. material hose, ⅜-in. atomizing hose and ½-in. air line from compressor to pump. Compressor must be adequate (85 cfm) for length and size of hose. Keep pressure as low as possible. Plaster mixers or hopper-type applicators also may be used.

Apply at rate of 4 to 8 sq. ft. per lb. Do not exceed recommended coverage, as subsurface defects, variations in base suction or color differences may show through, or lighter texture may result. Surfaces with uneven suction may require two coats. Let first coat dry before applying second. Remove splatters immediately from woodwork and trim. Provide 55°F. air and structural temperature during and after application. Do not use unvented gas or oil heaters. Avoid drafts while applying, but provide adequate circulating ventilation to aid drying. For comfort, use a respirator and protect eyes.

ARCHITECTURAL SPECIFICATIONS

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured

by United States Gypsum Company, and shall be applied in accordance with its current printed directions.

1.3 submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials, which, when approved shall be the standards of finish to be provided on this project.

1.4 delivery and storage of materials

a. All materials shall be delivered in their original containers bearing the manufacturer's name, brand name and directions for use.

b. All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 environmental conditions

During cold weather, provide thermostatically controlled heat to maintain 55°F. temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used. Provide adequate ventilation at all times for proper drying.

Part 2: products

2.1 materials

(Specify surface treatment and finish materials from application directions.)

Part 3: execution

3.1 surface preparation

Before applying, prepare surfaces as required in product directions. The base surface must be sound, firm and dry, clean and free of dust, dirt, grease or other foreign material (see Specifications in U.S.G. Folder SA-933).

3.2 application

Apply finishes according to product directions. Finishes must be evenly spread and free from runs, sags and other blemishes. Allow all coats to dry before applying following coats (for more detailed information, see Specifications in U.S.G. Folder SA-933).

PRODUCT DATA

Binder: Amylum.

Aggregate: Vermiculite.

Thinning: Water.

Tinting: Not recommended. Usually overpainted.

Drying Time: Dries to touch in 30 to 60 min. Let dry before recoating.

Color: Offwhite; may be spray-painted if desired after drying.

Coverage: Up to 8 sq. ft. per lb.

Storage: Close opened bags as airtight as possible and store in dry place.

Packaging
40-lb. bags.

Precautions

When mixing or otherwise working in a dusty atmosphere containing this material, ventilate, use dust collector, or wear eye protection and a respirator approved by the Bureau of Mines, or equivalent, to remove dust.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, IMPERIAL, METAL COAT, DURABOND, COVER COAT, PERF-A-TAPE, TAL.

UNITED STATES GYPSUM

BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

IMPERIAL QT

TEXTURE FINISH
(ST—Regular) (STC—Coarse)

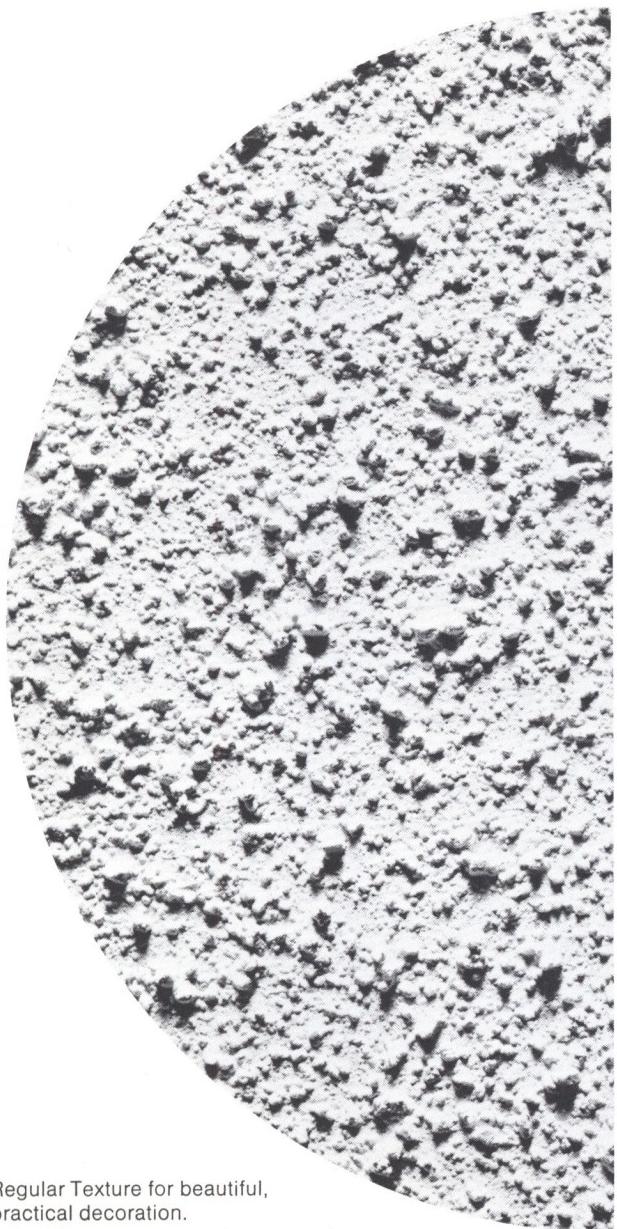


Super texture for bold acoustical appearance on interior ceilings

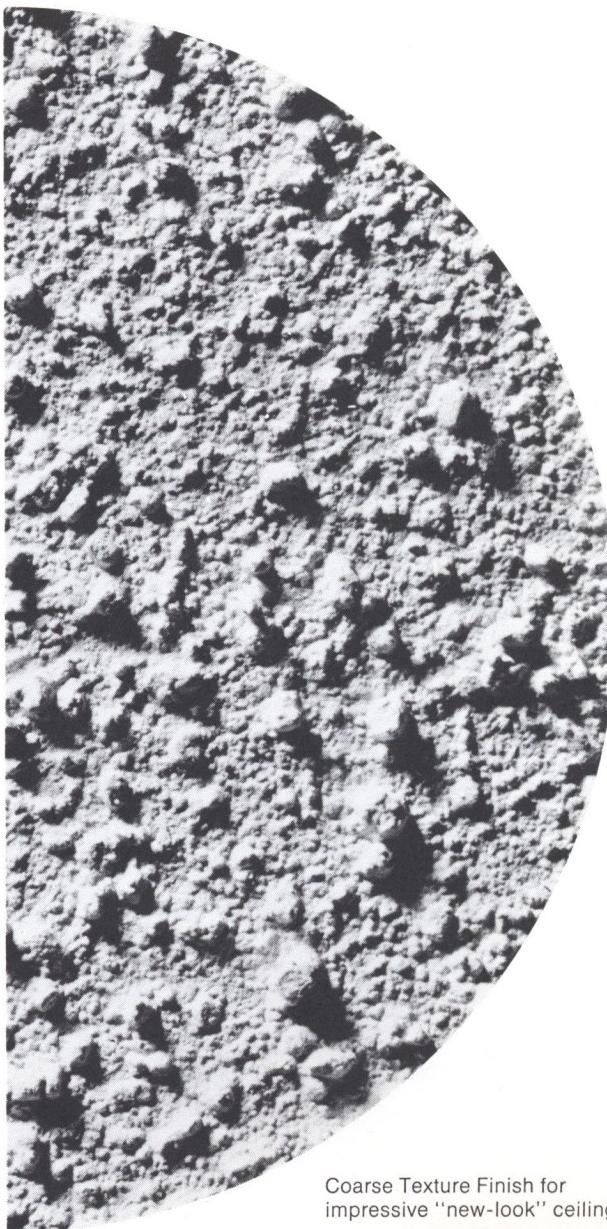
- Massive aggregate with finer background—good white color
- Fast pumping, low-cost spray application
- Exceptional hide and leveling qualities
- Non-asbestos powder formulation mixes quickly

Description

IMPERIAL QT Texture Finish, ST or STC, is a super-aggregated powder with vermiculite aggregate providing a bold, rugged surface with a fine perlite-aggregated background. Offers the impressive elegance of an acoustical ceiling finish but with no acoustical correction. Available in two types for choice of decorating variety. Mixed with water at job site—requires no soaking period or extended mixing, even in cold water. Provides good pumpability for fast, easy spray application. Bonds to new or old concrete, gypsum panels, plaster, wood, and even metal pipe. Levels minor surface irregularities, masks surface defects, and has superior resistance to fissure cracking in normal thicknesses. Dries to a crisp white finish that usually is left unpainted but may be overpainted if desired. IMPERIAL QT Latex Additive may be added to prepared Finish to increase whiteness and improve hardness.



Regular Texture for beautiful, practical decoration.



Coarse Texture Finish for impressive "new-look" ceilings.

IMPERIAL QT TEXTURE FINISH—ST, STC

Advantages

Unique, low-cost textures. Two intriguing texture finishes offer bold, handsome "cover-up" ceiling decoration. Low-cost application is important feature.

Fast, safe application. Easily pumpable for multi-story construction. Non-asbestos formulation meets Federal safety requirements for spraying.

Matches color with wall finish. IMPERIAL QT Texture Finish matches U.S.G. wall textures to minimize discoloration caused by ceiling overspray. Eliminates masking, reduces cleanup.

Ideal for new work and remodeling. Helps you finish jobs fast for reduced labor and material costs. In remodel work, easy-to-use texture material covers flaws and discolorations—gives old ceiling surfaces fresh, modern look.

Limitation

Application below grade or in high-humidity areas not recommended.

DIRECTIONS

Preparation: All surfaces must be dry, clean and sound. Dull glossy surfaces; prime metal with METAL COAT Zinc Chromate Primer. Fill and seal wood surfaces. New concrete should age 60 days or more. Remove form oils, grease, efflorescence. Grind plane differences and remove grinding dust or sludge. Fill and level with DURABOND Joint Compound, COVER COAT Drywall Compound or USG Super Block Filler. Reinforce and conceal drywall joints using PERF-A-TAPE Reinforcing Tape and a U.S.G. joint compound. Fill all fastener depressions with joint compound. Smooth surface scratches and scuffs. Correct plane irregularities, as these are accentuated by sharp, angular lighting. When prepared surfaces are dry and free of dust, apply TAL Vinyl Sealer or TAL Alkyd Flat Wall Paint over entire surface.

Mixing: Use clean mixing vessel equipped with variable-speed power agitator. Sift each 40-lb. bag of Finish into 7 or 8 gal. water, agitating water during powder addition. Stir until a creamy (but aggregated) lump-free mix is obtained. Adjust spray consistency by adding small amounts of powder or water. Do not overthin, as poor adhesion, lack of hide and texture variation may result. Do not intermix with other materials. *IMPERIAL QT Latex Additive*—available in 1-gal. cans, white only—may be mixed into Texture Finish in proportions of 1 gal. Additive to 40 lb. IMPERIAL QT to increase whiteness and improve hardness.

Application: Use spray equipment similar to Grover 452-A 10-to-1 ratio, double-action pump with 7½-in. stroke, equipped with 4-ft. pole gun having ¾- to ½-in. round orifice, or Binks 7-E-2 hand gun with ¾-in. round opening. Use ¾- to 1-in. material hose, ¾-in. atomizing hose and ½-in. air line from compressor to pump. Compressor must be adequate (85 cfm) for length and size of hose. Keep pressure as low as possible. Plaster mixers or hopper-type applicators also may be used.

Apply at rate of 4 to 8 sq. ft. per lb. Do not exceed recommended coverage, as subsurface defects, variations in base suction or color differences may show through, or lighter texture may result. Surfaces with uneven suction may require two coats. Let first coat dry before applying second. Remove splatters immediately from woodwork and trim. Provide 55°F. air and structural temperature during and after application. Do not use unvented gas or oil heaters.

Avoid drafts while applying, but provide adequate circulating ventilation to aid drying. For comfort, use a respirator and protect eyes.

ARCHITECTURAL SPECIFICATIONS

Part 1: general

1.1 scope—Specify to meet project requirements.

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be applied in accordance with its current printed directions.

1.3 submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials, which, when approved shall be the standards of finish to be provided on this project.

1.4 delivery and storage of materials

a. All materials shall be delivered in their original containers bearing the manufacturer's name, brand name and directions for use.

b. All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 environmental conditions

During cold weather, provide thermostatically controlled heat to maintain 55°F. temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used. Provide adequate ventilation at all times for proper drying.

Part 2: products

2.1 materials

(Specify surface treatment and finish materials from application directions.)

Part 3: execution

3.1 surface preparation

Before applying, prepare surfaces as required in product directions. The base surface must be sound, firm and dry, clean and free of dust, dirt, grease or other foreign material (see Specifications in U.S.G. Folder SA-933).

3.2 application

Apply finishes according to product directions. Finishes must be evenly spread and free from runs, sags and other blemishes. Allow all coats to dry before applying following coats.

(For more detailed information, see Specifications in U.S.G. Folder SA-933.)

PRODUCT DATA

Binder: Amylum.

Aggregates: Vermiculite and perlite.

Thinning: Water.

Tinting: Not recommended.

Drying Time: Dries to touch in 30 to 60 min. Let dry before recoating.

Color: White; may be spray-painted if desired after drying.

Coverage: Up to 8 sq. ft. per lb.

Storage: Close opened bags as airtight as possible and store in dry place.

Packaging
40-lb. bags.

Precautions

When mixing or otherwise working in a dusty atmosphere containing this material, ventilate, use dust collector, or wear eye protection and a respirator approved by the Bureau of Mines, or equivalent, to remove dust.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: IMPERIAL, METAL COAT, DURABOND, COVER COAT, PERF-A-TAPE, TAL.

UNITED STATES GYPSUM
BUILDING AMERICA

101 South Wacker Drive, Chicago, Illinois 60606

SA
1020

ULTRAWALL Partition Systems

First choice for exceptional beauty...
high performance...
fast assembly

system folder



DEMOUNTABLE PARTITION
drywall—metal stud

UNITED STATES GYPSUM
1976-3

10 P

10.1/Uni



Floor-to-ceiling glazed sections of
ULTRAWALL Partitions provide privacy with
visual openness in conference room.

Beauty with function is offered in corridor area by
high-performance ULTRAWALL Partition. Wall's vinyl facing
combines contemporary look with minimum maintenance.



Clean-lined, self-supporting ULTRAWALL Partitions in
bank-rail height combine office privacy with openness
for deep natural light penetration.

ULTRAWALL—

the easy-come, easy-go partition system— easy to install, easy to move . . . with the handsome look of permanence

ULTRAWALL Movable Partition Systems give new dimensions of function, utility and versatility impossible with fixed partitions. ULTRAWALL Systems offer independent erection on each side and individually removable panels for total cavity access. They cope beautifully but economically with the needs of commercial, industrial and institutional clients beset with frequent space alterations.

Easy-to-build, easy-to-move, non-load bearing walls with high fire and sound ratings are provided from only four basic components: noncombustible gypsum panels $\frac{3}{4}$ -in. thick, 24 and 30-in. wide set in steel runners and framed with three alternate metal stud systems (see page 5 for details). No exposed studs, battens or fasteners interrupt the smooth, clean-lined effect.

ULTRAWALL Partitions in bank rail, cornice or ceiling height are available with prefinished vinyl panels in 27 standard colors and five patterns as well as in ready-to-decorate plain gypsum panels.

Skilled installation is provided by experienced U.S.G. licensed contractors, and nationwide distribution assures prompt delivery of all components. The result is earlier completion, quicker occupancy.

Engineered for Quick Change—ULTRAWALL is one of the fastest-installing partitions; also relocated with maximum time savings.

The secret of speedy assembly is in the simplicity of component design and the ease of construction. Components are quickly moved for rearrangement of space or utilities, yet offer the appearance, rigidity, and advantages of permanent partitions.

Esthetic Versatility—More freedom of design with more functional capability makes ULTRAWALL adaptable to virtually any building plan or to the client's changing requirements—without waste of material. Bank rail, cornice and ceiling systems use the same basic components that differ only in type and placement of studs. Systems work interchangeably—fit all standard ceiling grid modules, permit ceiling heights to 12 ft., unglazed railing height to 48 in., and afford ample chase space of $1\frac{1}{8}$ in. for concealed wiring, standard-sized electric boxes and sound control blankets. ULTRAWALL Partitions allow erection on both sides or one side only to suit future tenant needs. Individual panels are removable for ready accessibility where needed. Beveled-edge panels are integrally kerfed to engage and conceal the studs.

Total flexibility extends to a choice of decorative panel surfaces, easily attached accessories for corners and windows, and color-anodized aluminum trim finish in new ULTRABRONZE.

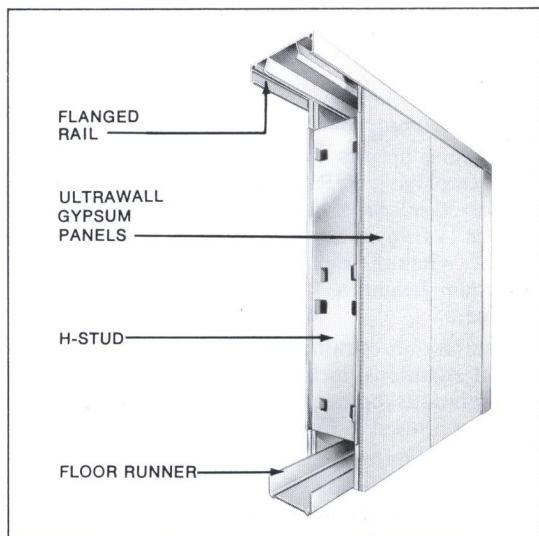
A unique door frame is completely reversible (right or left hand) even after initial installation. Hinge and strike locations adjust to premortised doors for quick, flexible attachment, plus two- or three-piece aluminum frames in a choice of two styles (see Specifications, page 12). Glazing components permit the use of glass anywhere.

Contemporary Styling—ULTRAWALL is engineered better for better design esthetics. Structural attachments are concealed, battens eliminated, and panels are mounted flush to present a smooth-faced, permanent partition appearance. The elegant colors and deep-dimensional appearance of vinyl finish add distinction and beauty . . . give complete freedom to control the tone and atmosphere of building interiors.

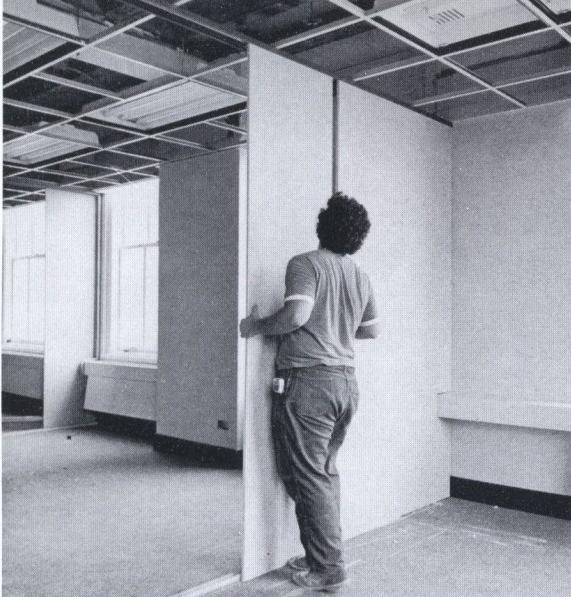
Woodgrained vinyl facings can be used to lend dignity, quality and prestige . . . or dramatic colors and deep-textured patterns can be selected to project an image of richness and importance . . . crisp, bright pastels are available to impart a modern clean-lined look. The appearance of spaciousness is achieved with easily installed glazing elements and aluminum trim.

Important Economies—ULTRAWALL lowers in-place assembly, re-erection, replacement and maintenance costs. Actual job studies have shown labor costs to be considerably below those for fixed partitions. ULTRAWALL frequently out-prices most other movable partitions. That's because its multi-purpose components and prefinished panels are engineered to work together to cut time and labor on the job.

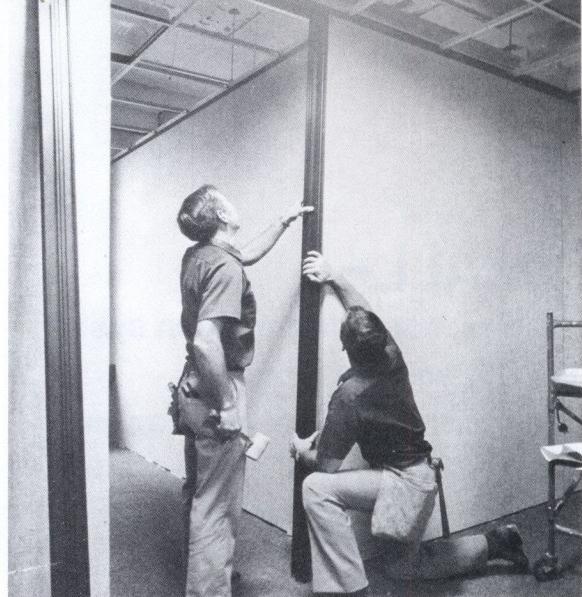
Relocation costs are a fraction of the expense of changing a fixed partition, and often less than most other removable partitions. Components are salvageable and reusable. There's no waste, no debris to clean up. Maintenance is minimal: vinyl-surfaced panels require little cleaning, no repainting. Satin-finish trim for glazing and door frames are of extruded, anodized aluminum for other maintenance advantages.



Four basic components provide simplicity in design, layout, estimating, erection, moving, reassembly and replacement. ULTRAWALL Partition construction covered by U.S. Patent No. 3,027,605, other patents pending.



Fast, sequential assembly characterizes the speedy ULTRAWALL system, ideal choice for both remodeling and new construction work.



Doors are reversible with SMR Delta Door Frames, for trouble-free partition changes. No need to stock both left- and right-hand door frames.

High Fire and Sound Ratings—Code approvals have been readily attained with ULTRAWALL Systems—all components are noncombustible. The 24-in. panel assembly with sound attenuation blankets offers a 2-hour fire rating. Both 24-in. and 30-in. panels in floor-to-ceiling height assembly carry a 1-hour fire rating without *extra* material. Most other movable partitions require special studs or added fire protection in the cavity to meet code approvals.

ULTRAWALL Partitions also provide maximum privacy and exceptional sound control. With THERMAFIBER Sound Attenuation Blankets in the wall cavity, ULTRAWALL offers a 48 STC rating—42 STC without attenuation blankets. No other movable partition system provides such ratings without the addition of other materials. Where higher sound requirements are called for, an ULTRAWALL Partition with double panels offers a 50 STC rating.

limitations

1. Non-load bearing.
2. Not recommended where exposed to excessive moisture.
3. Limiting heights for Ceiling Height Partition: for 24-in. panel employing H/R or H-studs 12 ft.-0 in., T-studs 12 ft.-6 in.; for 30-in. panel employing H/R or H-studs 10 ft.-0 in., T-studs 11 ft.-6 in. Limiting height 48 in. for unglazed Railing Height. When the rigidity of a permanent partition is desired, maximum height is 10 ft. and perimeter restraint must be provided.
4. Limiting unrestrained length between supports of Cornice Height Partitions, including those with door openings joined by continuous top rail, must not exceed 15 ft. Solid core doors must not be used in Cornice Height Partitions over 10 ft. long.
5. Limiting unrestrained length between supports of Bank Rail Partitions having continuous top rail must not exceed 15 ft. Longer runs require rail struts or intersecting partitions at 15 ft. intervals. Rail struts also required at terminals, swinging gates and max. 10-ft. intervals on free-standing partitions. When bank rail is installed over lightweight concrete floors, L- or T-intersections are recommended at free-standing terminals and at 15 ft. intervals.

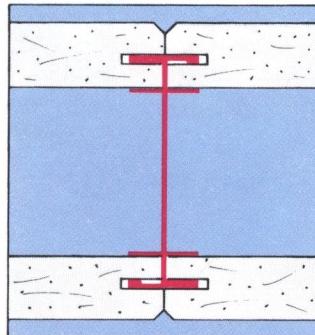
fire and sound ratings

assembly description	test no.	fire rating	STC rating
Movable ULTRAWALL Partition—concealed H-studs 24" o.c.—steel runners— $\frac{3}{4}$ "x24" bevel edge ULTRAWALL gypsum panels—joints unfinished wt 7 width 3 $\frac{3}{8}$ "	U of C(2) 8/18/67 BBN-701008(1)	1 hr. 42	
Same construction as above except with $\frac{3}{4}$ "x30" ULTRAWALL gypsum panels	U of C(2) 7/23/69	1 hr.	
Same construction as above except with $\frac{3}{4}$ "x30" ULTRAWALL gypsum panels and aluminum ceiling runner	WJE(3) 12/29/70	1 hr.	
Movable ULTRAWALL Partition—concealed H-studs 24" o.c.—1" THERMAFIBER sound attenuation blankets— $\frac{3}{4}$ "x24" bevel edge ULTRAWALL gypsum panels—joints unfinished wt 7 width 3 $\frac{3}{8}$ "	BBN-701216(1)		47
Movable ULTRAWALL Partition—concealed H-studs 24" o.c.—1 $\frac{1}{2}$ " THERMAFIBER sound attenuation blankets— $\frac{3}{4}$ "x24" bevel edge ULTRAWALL gypsum panels one side—double layer opposite side with $\frac{3}{4}$ " Z-splines between layers—joints unfinished—perimeter caulked—painted wt 12 width 4 $\frac{1}{2}$ "	UL Des U416(5)	2 hrs.	
Movable ULTRAWALL Partition—concealed T-studs both sides 24" o.c.— $\frac{3}{4}$ "x24" bevel edge ULTRAWALL gypsum panels—joints staggered and unfinished—perimeter caulked wt 8 width 3 $\frac{3}{8}$ "	TL-70-198(4)		50
Same construction as above with 1 $\frac{1}{2}$ " THERMAFIBER sound attenuation blankets wt 8 width 3 $\frac{3}{8}$ "	TL-70-252(4)		40
Movable ULTRAWALL Partition—concealed H/R-studs both sides 24" o.c.— $\frac{3}{4}$ "x24" bevel edge ULTRAWALL gypsum panels—joints unfinished—perimeter gaskets wt 7 width 3 $\frac{3}{8}$ "	USG-750206(6)		40
Same construction as above with 1 $\frac{1}{2}$ " THERMAFIBER sound attenuation blankets wt 7 width 3 $\frac{3}{8}$ "	USG-740909(6)		46

(1) Bolt, Beranek & Newman (2) University of California (3) Wiss, Janney, Elstner & Associates (4) Riverbank Acoustical Laboratories (5) Underwriters Laboratories Inc. (6) United States Gypsum Acoustical Research Facility.

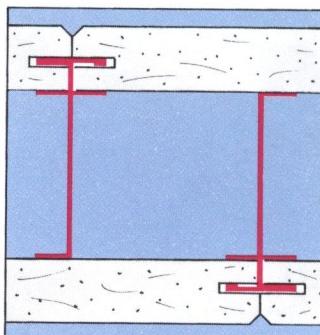
Three interchangeable, fast-installing systems— each with special advantages

Each ULTRAWALL assembly offers major advantages in simplicity, low cost and design features—provides maximum versatility with economy and ease of installation. Systems can be interchanged in the same installation, as described below, to provide accessible panels only where needed. The only variable is the stud.



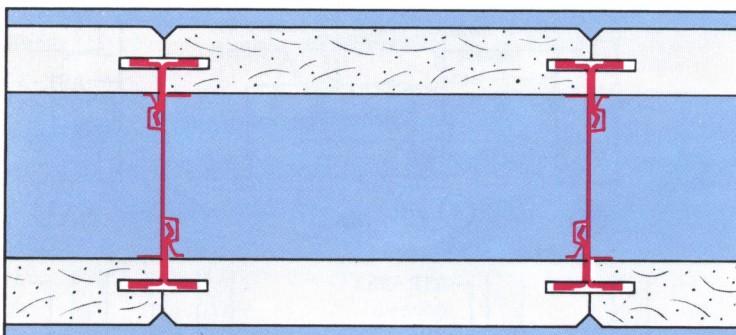
Standard H-Stud System

One of the fastest, simplest movable partitions—outstanding for low cost. The system is assembled, dismantled and reassembled quickly. And because accessibility usually is not required for most buildings (electricians and other trades quickly make changes without removing panels), this ULTRAWALL system is virtually without equal. For quickest installation and lowest in-place cost of the three ULTRAWALL assemblies, specify the standard H-stud system.



T-Stud System

Allows erection of one side of the partition only, if desired. This permits completing the partition after adjoining space is leased, allowing the tenant to select his own surface covering. Additionally, when considerable electrical work is to be installed, it is simpler to leave the partition semi-finished, allowing other trades to complete their work before the second side is enclosed. T-studs may be interchanged with H/R or H-studs. An outstanding choice for tenant or service walls.

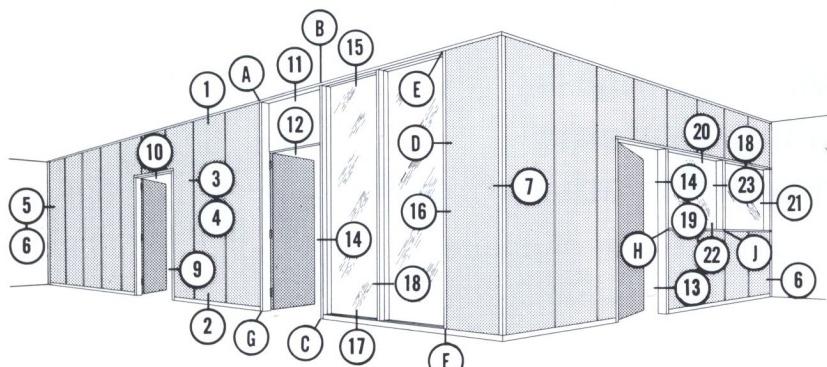


H/R-Stud System

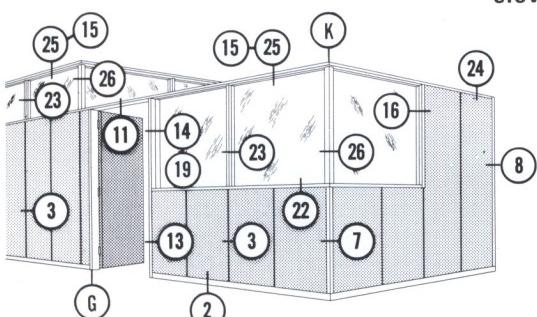
Provides access with full security. Opposite panels cannot be removed, yet alternate panels are easily removable and replaceable, providing future access to each cavity. H/R studs snap in place, the same speedy installation as H-studs. They can be used for a single panel, a series or an entire installation. All other components remain the same; only the stud is changed.

elevations / details

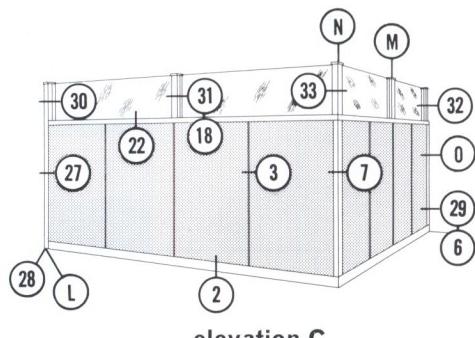
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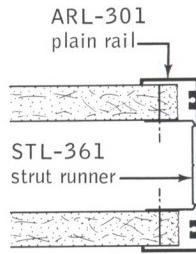
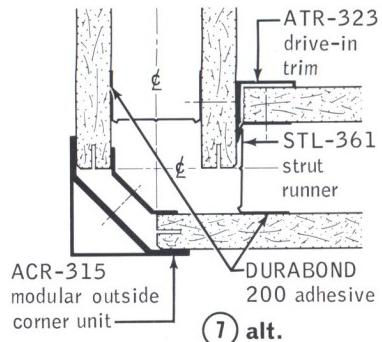
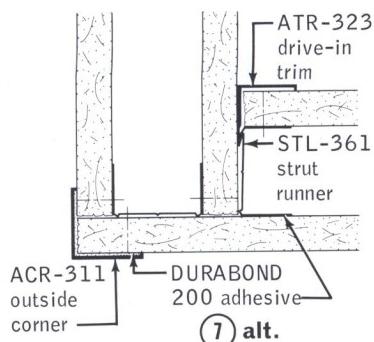
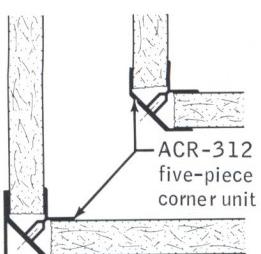
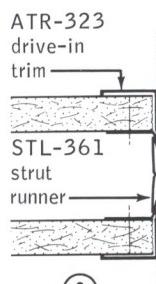
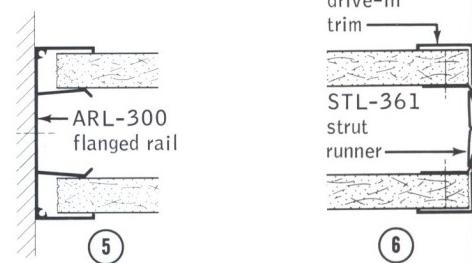
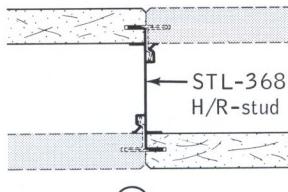
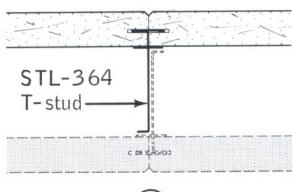
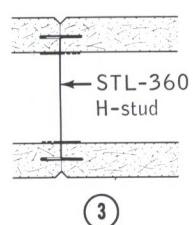
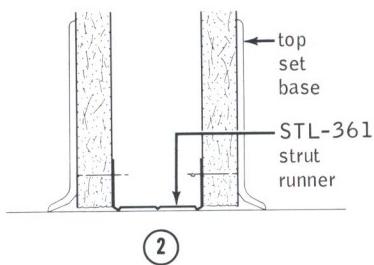
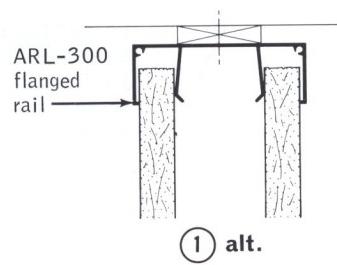
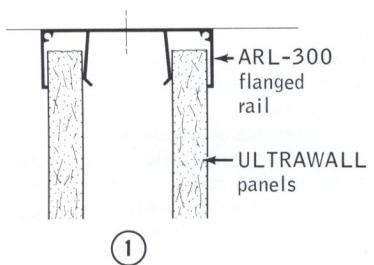
elevation A



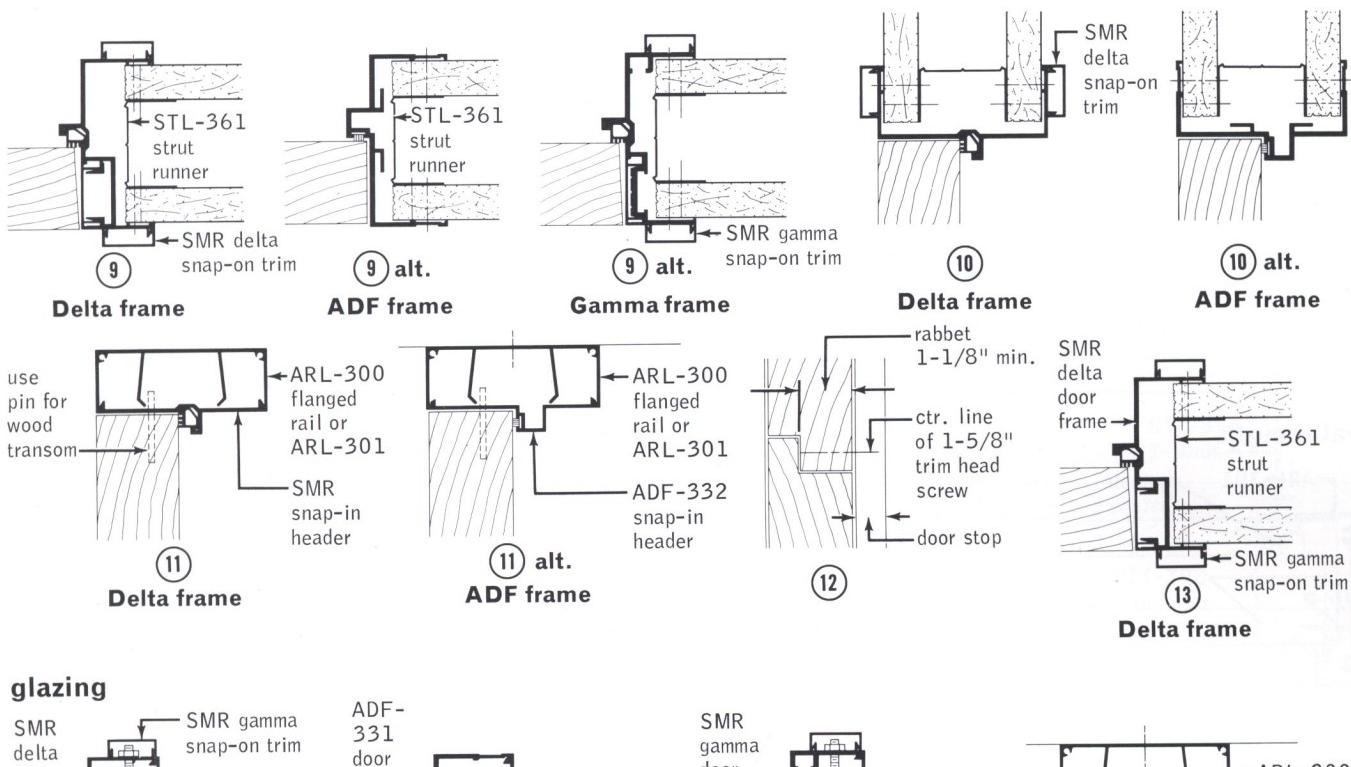
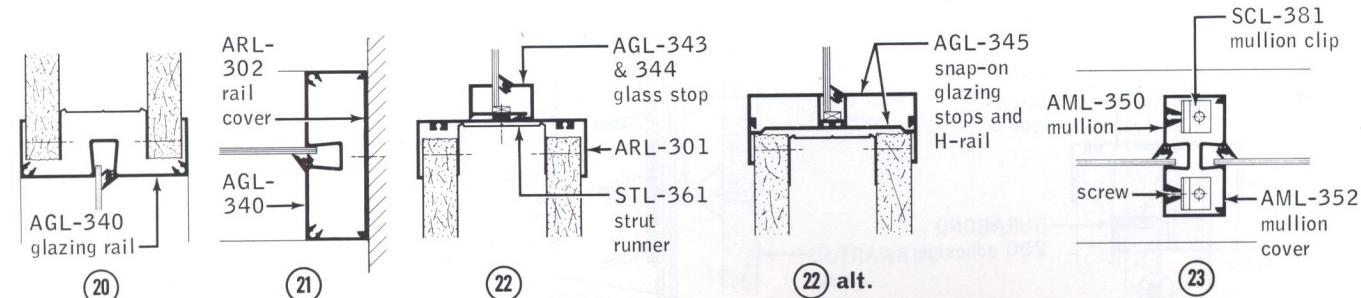
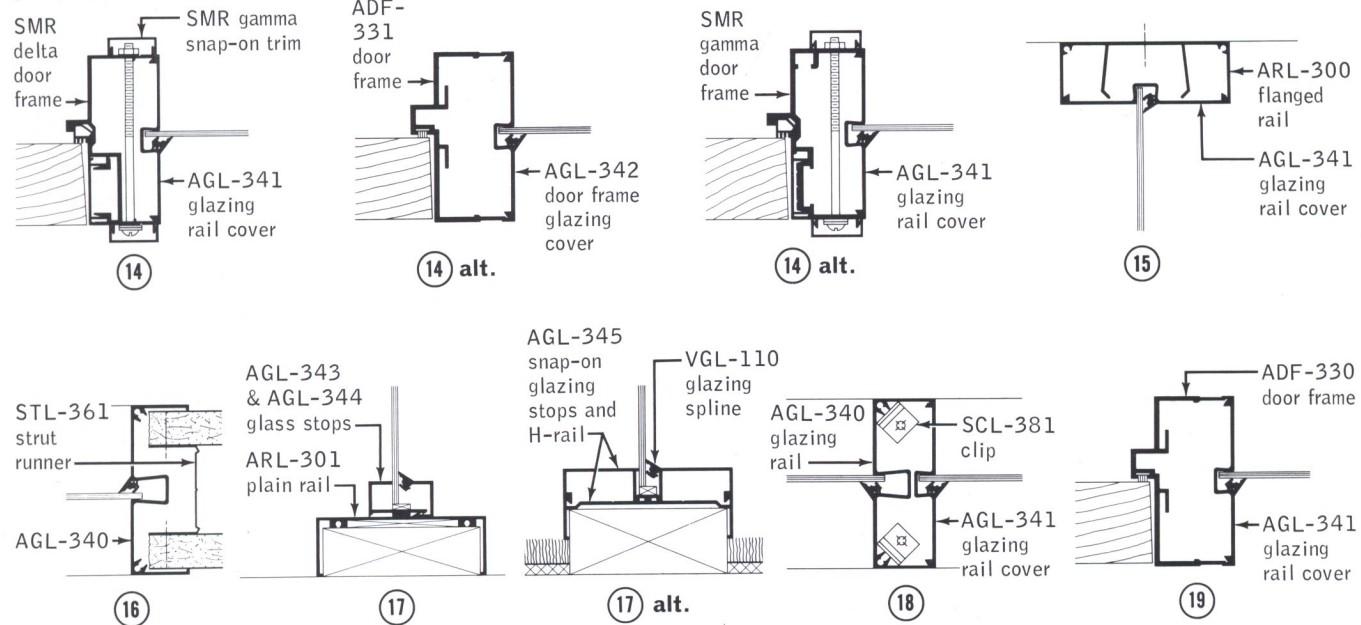
elevation B



elevation C



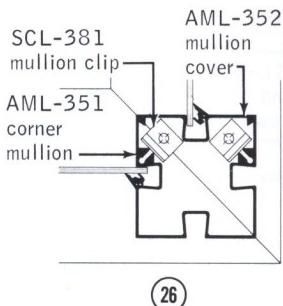
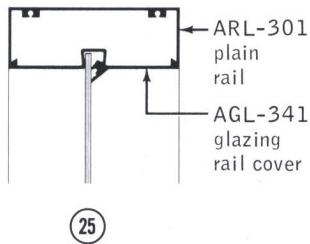
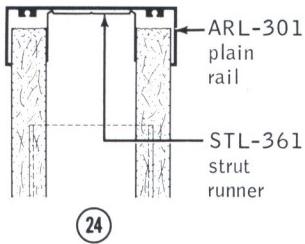
details

**glazing**

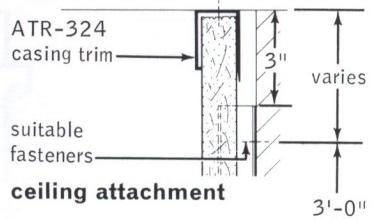
details

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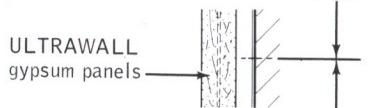
cornice height



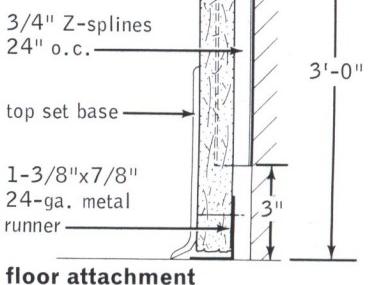
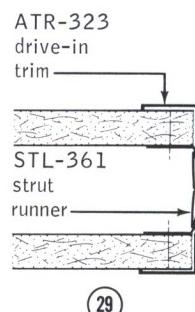
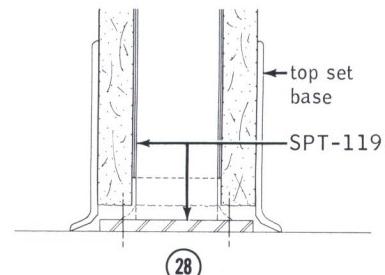
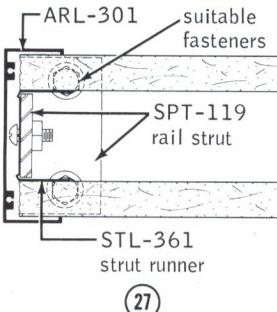
wall furring



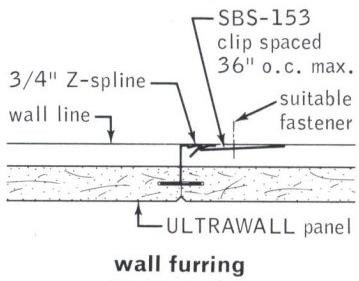
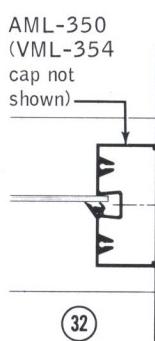
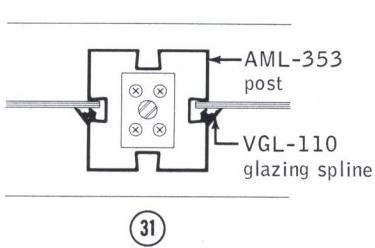
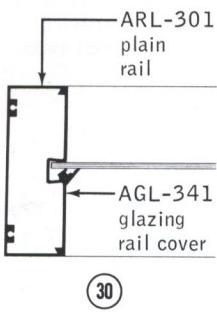
ceiling attachment



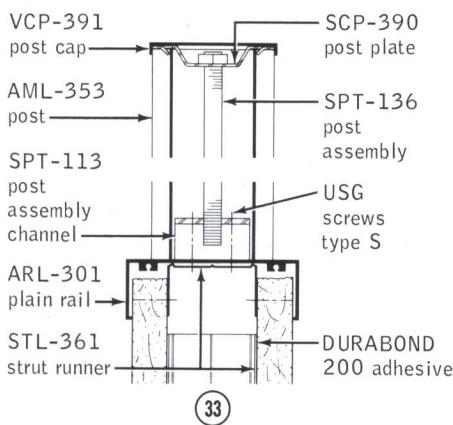
rail height



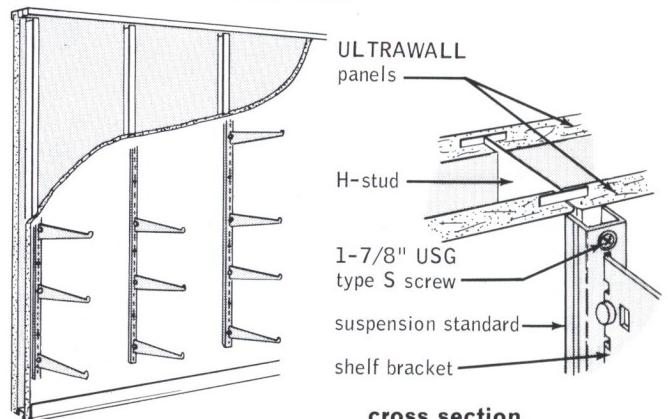
floor attachment



wall furring cross section



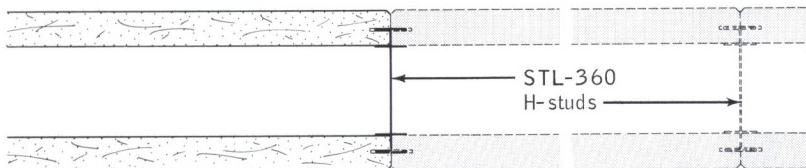
bookcase or shelf attachment



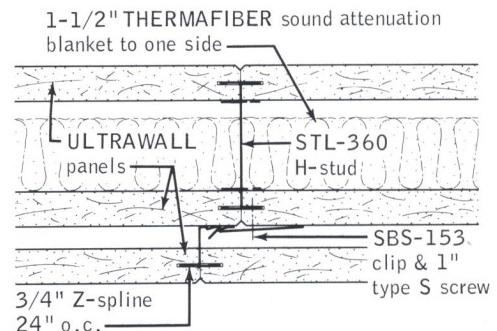
cross section

details— alternate stud systems

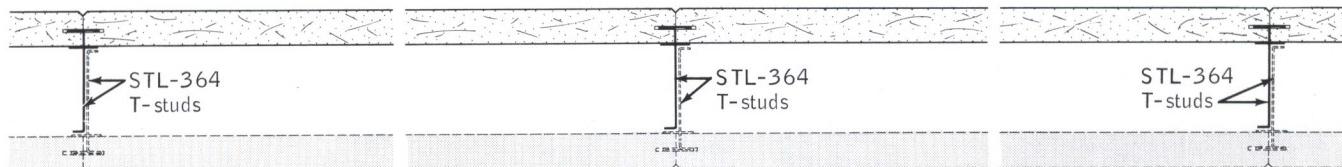
ULTRAWALL Partition Systems



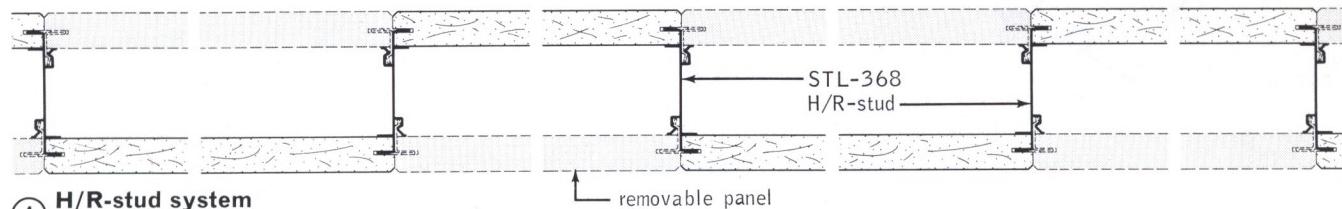
③ standard H-stud system
both sides erected together progressively



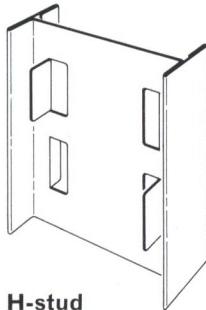
H-stud system sound wall—TL-70-198



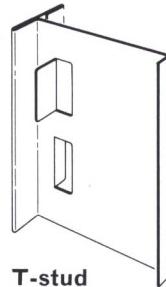
④ T-stud system
each side erected independently



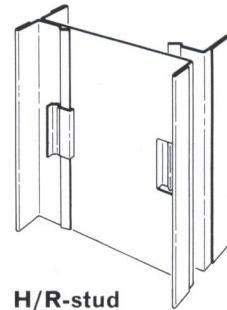
④ H/R-stud system
removable panels



H-stud



T-stud



H/R-stud

fastener load tables

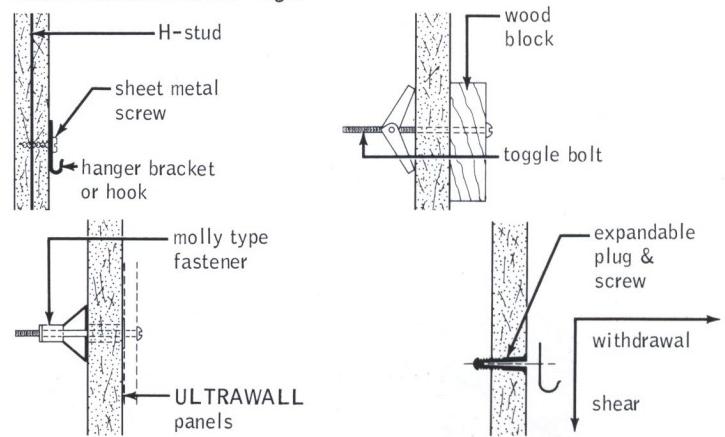
lightweight fixture attachment

type fastener or attachment	allowable withdrawal resistance-lbs.	allowable shear resistance-lbs.
no. 8 sheet metal screw into H-stud	50	80
1/4" molly bolt in panel only	35	80
1/4" toggle bolt in panel only	40	60
no. 8 sheet metal screw in plastic plug	20	40

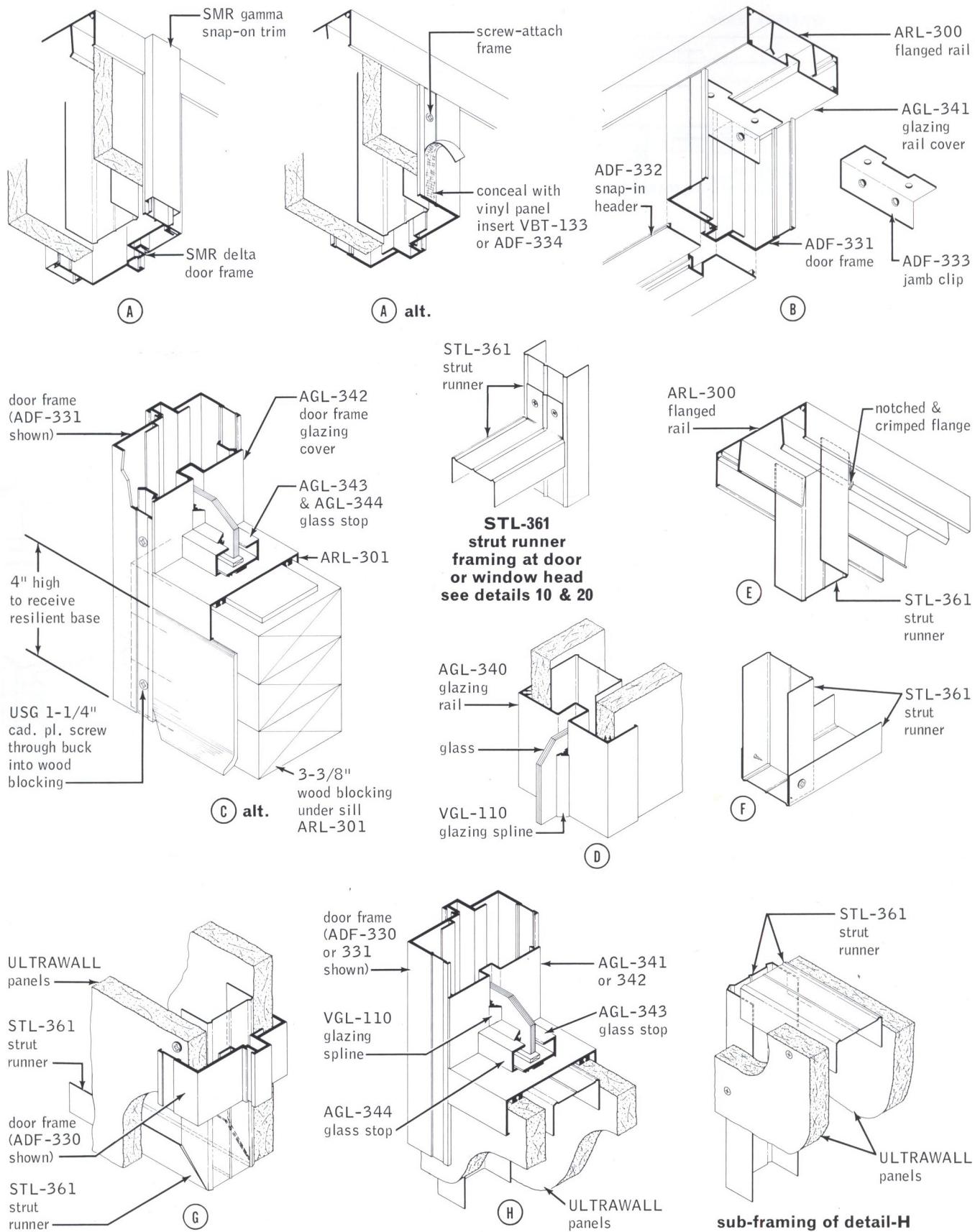
bookcase attachment

bracket system	fastener & spacing	maximum load per bracket
Knape & Vogt Mfg. Co.— brackets 24" o.c.	1 1/4" Type S screw 24" o.c. into H-stud	100 lbs.

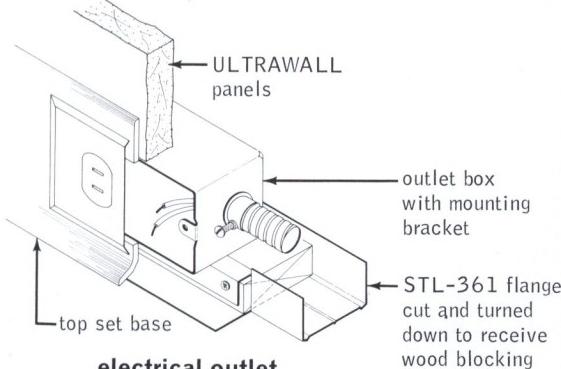
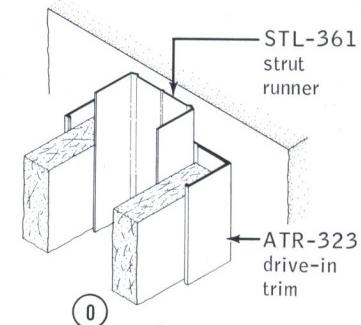
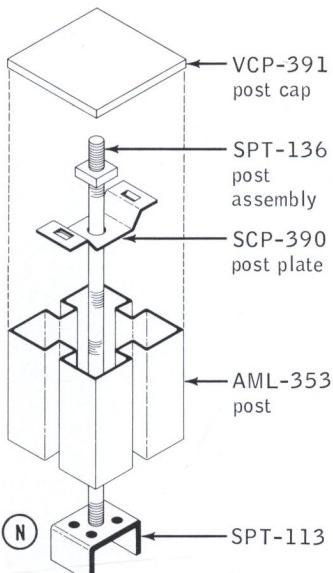
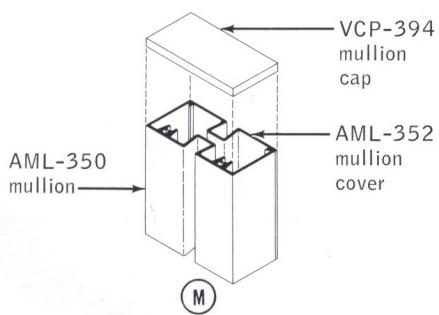
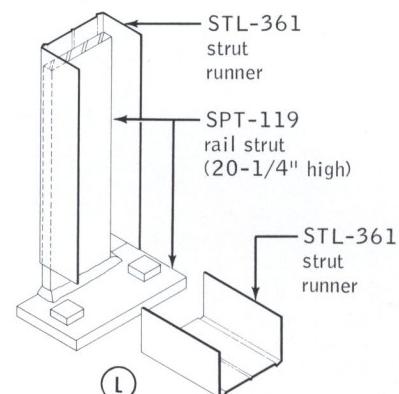
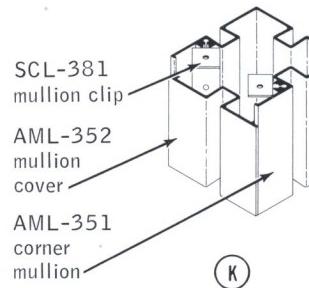
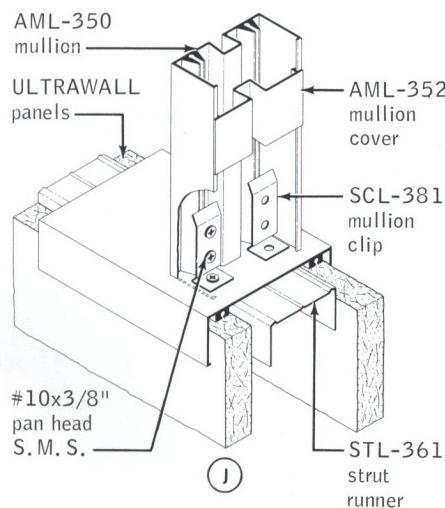
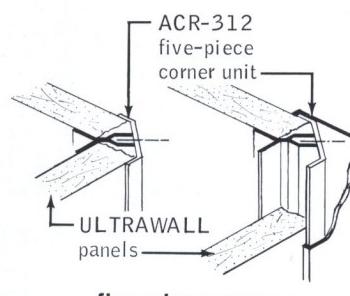
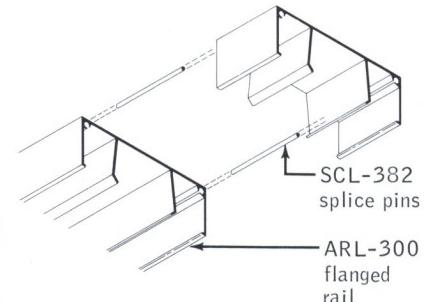
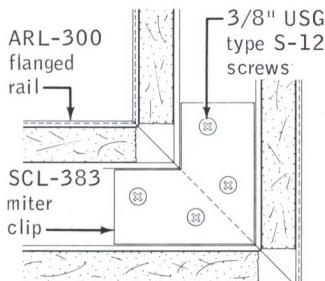
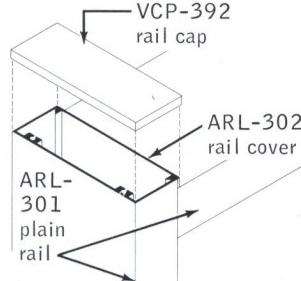
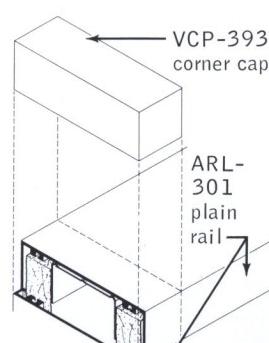
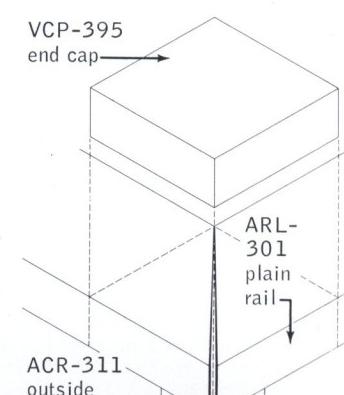
fixture attachments—light



details—H-stud system



sub-framing of detail-H

details—H-stud system**ULTRAWALL Partition Systems****electrical outlet****five-piece corner****horizontal rail splice****miter alignment clip**
inside view, flanged rail**rail terminal****alt. rail terminal****rail corner**

specifications

notes to architect

1. USG Aluminum Door Frames for ULTRAWALL Partitions include three different types. All are available for both ceiling-height and door-height openings and come in two- and three-piece styles for hollow core and solid core doors in 1 3/4" thicknesses only.

The **USG SMR Aluminum Door Frames**, both Delta and Gamma styles, are available with a snap-in header (2-pc.) for ceiling-height openings or milled header and mitered snap-on trim (3-pc.) for door-height openings. SMR Gamma also available in throat sizes from 3 1/2" to 4 1/8".

Both SMR frames are self-mortising and reversible. They include snap-in mortise closures, vinyl door mute, aluminum snap-in strike plate, hinge-attachment screws and adjustable hinge back-up plates (Delta only). Available in satin anodized and ULTRABRONZE finishes.

The **ADF Aluminum Door Frame** is non-reversible and comes in two- and three-piece styles, satin anodized finish only. The two-piece frame is for ceiling-height openings, furnished with hinges for 3'0"x7'0" door and transom above. Also available with four hinges for ceiling-height door leaves on special order. Ends are cut square. Head is completed with a snap-in door header. Available in 10' height, right or left-hand opening.

The three-piece ADF Frame is complete with mitered joints for 3'0"x7'0" doors, right- or left-hand opening.

ADF non-reversible frames are supplied with concealed hardware including three 4 1/2"x4" hinges and standard 2 3/4"x1 1/8" strike and strike box (refer to **ULTRAWALL Full-scale Details** for template dimensions). Ball-bearing hinges are available and should be specified when closers are required; available with four hinges for ceiling-height doors on special order.

2. In certain areas where seismic design code requirements govern, consult local building codes for partition limitations.

3. Where this partition is used as a sound barrier, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical fixtures and to seal all intersections with the adjoining structure. Eliminate cutting holes back to back and adjacent to each other.

4. The addition of THERMAFIBER Sound Attenuation Blankets to the stud cavity, pressed tightly in place, stapled to the back side of one face of partition, will increase the sound transmission loss of the partition.

5. Fixture Attachment—Lightweight fixtures and trim should be installed using plastic plugs or other expandable anchors for screw attachment. Medium and heavyweight fixtures should be supported from the primary framing.

6. Electrical Fixtures—The depth of electrical boxes should not exceed 2 1/2". Standard conduit and boxes may be used.

7. See U.S.G. product folders in this series: Paint Products Folder SA-933 for paint specifications, TEXTONE Gypsum Panel Folder SA-928 for vinyl colors and patterns.

Part 1: general

1.1 scope—Furnish and erect ULTRAWALL Partitions as indicated on the plans and specified hereunder.

1.2 description of systems—Partitions shall be flush-panel type, 3 3/8" thick, (railing, cornice, and/or ceiling height).

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, FIRECODE, THERMAFIBER, ULTRAWALL, TEXTONE, DURABOND, ULTRABRONZE. SMR is Reg. U.S. Pat. & Tm. Off. by Modulex, Inc.

1.3 qualifications

a. Installation of ULTRAWALL Partitions shall be by a U.S.G.-licensed contractor.

b. All materials included herein, except as noted, shall be supplied by United States Gypsum Company.

1.4 submittals—The partition contractor shall submit shop drawings showing partition construction details.

1.5 delivery and storage of materials—All materials shall be delivered in their original unopened packages. Materials shall be stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

Part 2: products

2.1 materials

a. **Fire-rated Gypsum Panels**—ULTRAWALL Panels (plain) (vinyl-faced—specify color) 3/4" thick by (24") (30") wide by appropriate height.

b. **Studs**—Roll-formed electro-galvanized steel (one-piece H-stud) (one-piece T-stud) (three-piece H/R stud).

c. **Floor Runners**—Roll-formed electro-galvanized steel to hold panels in alignment.

d. **Ceiling Runners**—One-piece extruded aluminum runner with formed-in spacers, and integral trim to conceal top edges of panels.

e. **Z-splines**—3/4" Z-splines, for attachment of third layer of panels.

f. **Attachment Clips**—SBS-153 Z-spline attachment clips.

g. **Top Set Base**—For adhesive application after panels have been erected and finished. (Base not by U.S.G.)

h. **Door Frames**—USG Aluminum Door Frames (two-piece) (three-piece), (ADF-non-reversible) (SMR-reversible Delta) (SMR-reversible Gamma), (color-anodized aluminum—not available in ADF).

i. **Doors**—Wood doors, 1 3/4" thick, 3'0" by 7'0" (left-hand opening) (right-hand opening). (Doors not by U.S.G.)

j. **Window Frames**—Sized as shown on plans and assembled from standard ULTRAWALL extruded aluminum parts. Glass furnished by (partition contractor) (glazing contractor).

k. **Aluminum Trim**—(Exposed members etched and anodized with permanent satin finish) (ULTRABRONZE color-anodized aluminum).

Part 3: execution

3.1 partition erection

a. **Studs and Runners**—Lay out the partition. Securely attach floor and ceiling runners. Accurately plumb strut studs at door openings and ULTRAWALL terminals.

b. **Gypsum Panels**—Install ULTRAWALL Panels, steel studs and trim members in accordance with United States Gypsum Company's installation directions.

c. **Workmanship**—Erect partitions so as to be rigid, plumb, with horizontal lines leveled, neat in appearance, and free from defects in workmanship. Conceal all connections to walls, floors, ceilings, cornice sections, and connections between gypsum panels. (Adjust all hardware to proper working order.)

NOTE: All products described here may not be available in all geographic markets. Contact your local U.S.G. sales office or representative for information.

Monolithic painted wall relieved by full-height doors and an exposed ceiling runner in dark finish sets off soothing color scheme of 2900 Series fixed partitions.



Beauty of function is vividly portrayed in use of wall color and door arrangement in 700 Series installation.

Modular versatility opens more doors to creative interiors—distinctive and durable

VAUGHAN WALLS are high-performance interior gypsum partitions for office, institutional and school buildings that combine the design flexibility of movable walls with permanent wall appearance and service. Developed for modern, functional beauty, VAUGHAN WALLS Partitions offer the advantages of crisp, clean lines and outstanding fire and sound resistance only available in gypsum drywall partitions.

Specially engineered gypsum panels are manufactured by United States Gypsum Company to meet the rigid tolerances and specifications of Vaughan Walls, Inc. The panels are job-laminated and assembled with architecturally designed aluminum extrusions, floor and ceiling runners, door frames and glass sections—the result of years of continual refinement—to provide several basic systems:

700 Series—Movable partitions featuring minimum trim projection and a contemporary low profile appearance. Simplicity and grace make the 700 Series a popular choice. Available in 2½-in. chase wall and 3-in. sound wall.

2700 Series—Fixed partitions incorporating the smooth planes and flat, simple trim of contemporary design, yet highly competitive with conventional drywall construction. These systems intermix with the 700 Series door frames and glazing extrusions for complete design continuity while taking advantage of fixed partition economy where movability is not required. Available in 2½-in. chase wall and 3¾-in. sound wall.

900 Series—Movable partitions offering projected aluminum trim designed to accentuate door units and glazed walls. The clean, crisp lines of this system have made it the style leader in the industry. Available in 2½-in. chase wall and 3-in. sound wall.

2900 Series—Fixed partitions providing a completely smooth monolithic surface. They also feature the unmatched elegance and clean profiles of 900 Series door frames and glazing extrusions. Competitively priced with conventional drywall, these systems offer design continuity for maximum compatibility with other VAUGHAN WALLS systems. Available in 2½-in. chase wall and 3¾-in. sound wall.

Low Rail Series—Movable partitions with prefinished panels accented by anodized aluminum trim. Ideal for use in bank rails, landscape office planning or as privacy screen for secretarial and clerical pools. Installs quickly over carpet or resilient tile. Available in 2½-in. thick panels (24- or 30-in. wide).

All installations are made by licensed VAUGHAN WALLS contractors, specially trained to provide expert design consultation, prompt installation and fine craftsmanship. Features:

Versatile—Ceiling, door and bank rail heights are available. Glass panels can be used in almost any combination. These highly adaptable units serve every partition need from modular

panels with V-joints—for low-cost utility and ready movability—to permanent monolithic walls with custom finishes.

No posts or intermediate studs are used. Door openings may be located anywhere and walls may intersect anywhere to provide complete freedom in space planning and design. All electrical and telephone services are easily carried within the partitions; outlets may be placed where needed.

Beautiful—All exposed aluminum members are satin-buffed and anodized in rich shades of aluminum, bronze and black. These attractive finishes complement the variety of panel surfaces that may be used.

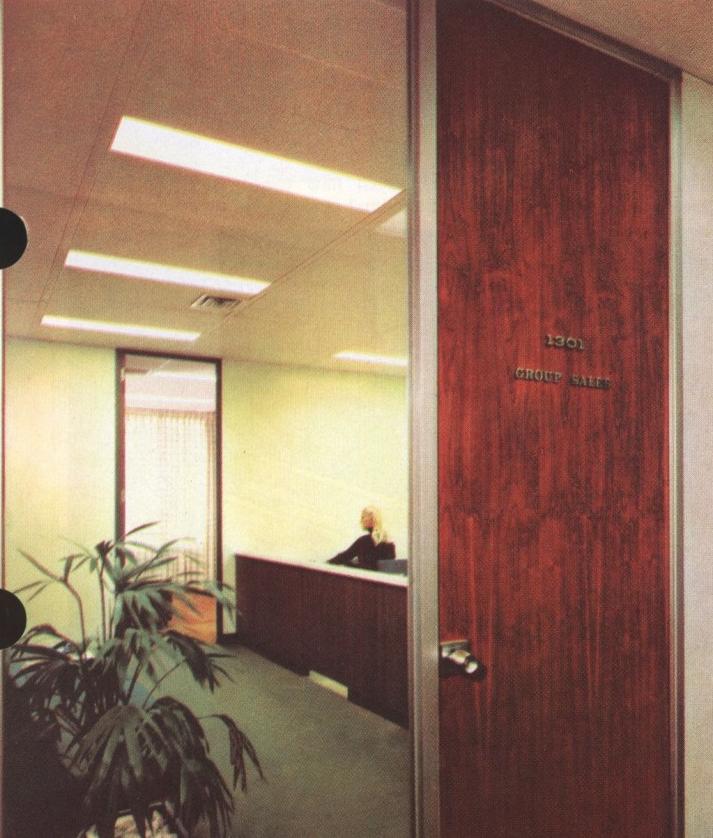
Surface finish materials include vinyls; $\frac{1}{8}$ -in. wood veneers for smooth, permanent walls; VAUGHAN WALLS WOOD WRAP veneer for movability; paint; or any wallcovering of the decorator's choice.

Design Flexibility—These systems meet virtually all design requirements. Matching walls can be added at any time. Existing wall arrangements can be modified—from ceiling height to cornice or bank rail heights. Door openings and glazing can be added or removed, without special framing, to suit changing light or privacy requirements.

Movable VAUGHAN WALLS Partitions present the sturdy, solid appearance of fixed partitions and easy, prompt mobility on either side for future space requirements. All components are virtually 100% reusable.

Economical—Factory- or job-laminated VAUGHAN WALLS Partitions are ready for immediate installation. There is no expensive inventory needed—all components are supplied as required. Partition cost is usually much less—for the same fire and sound performance—than other movable partitions. Handsome surfaces require little maintenance, take abuse and still look new.

Ceiling-height door in combination with full-height clear glass sidelight and low-profile 700 Series trim gives spaciousness and importance to office entry. Richly finished wood bank rail adds effectiveness.



Fire Resistant—Fire-resistance ratings of 1 hour have been established without change in basic construction (see table page 5). Conformance to building codes is assured, and reduced insurance rates are frequently possible. The 700 Series offers the only aluminum door frame assembly that carries a UL label for Class C fire doors.

Sound Control—These systems create an atmosphere for efficient office performance—maximum privacy for libraries and conference rooms. Versatile VAUGHAN WALLS Partitions with sound ratings ranging from 37 STC to 45 STC (see table page 5), offer more effective sound control than many other movable or permanent partitions. Other sound walls with ratings up to 61 STC are also available.

Dependable—A nationwide network of licensed VAUGHAN WALLS contractors, with locally stocked aluminum components and U.S.G. plants and warehouses strategically located throughout the country, make VAUGHAN WALLS Partitions readily available for fast, reliable delivery. Finish material can be ordered when job is planned—delivered when needed.

limitations

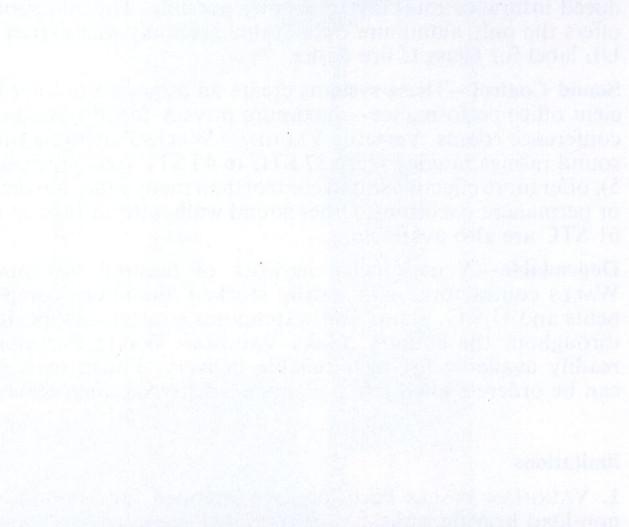
1. VAUGHAN WALLS Partitions are intended for use only as non-load bearing walls.
2. Maximum height is 12 ft. for 700, 2700, 900 and 2900 Series partitions; 10 ft. for sound walls.
3. Maximum unsupported run for 700, 2700, 900 and 2900 Series less-than-ceiling-height and glazed cornice height partitions is 14 ft.; for Low Rail Series, 8-ft. with freestanding end, 14-ft. with support restraint at both ends.
4. VAUGHAN WALLS Partitions should not be used where normally exposed to moisture or excessive humidity.

Wood veneer doors matched in sequence to center dividing panel are flanked by full-height opaque glass in this office arrangement. Projected 900 Series trim accents each unit.



Basic VAUGHAN WALLS Gypsum Partitions

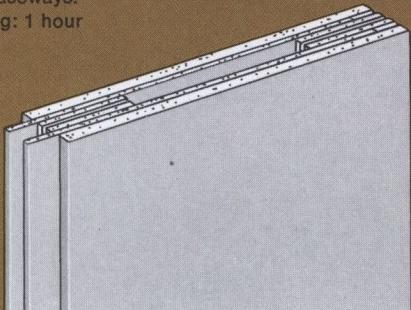
Movable



3-in. Sound Wall (700 and 900 Series)

Space-saving party or privacy wall; also used in library and conference rooms. Four layers of VAUGHAN WALLS gypsum panels are laminated to double coreboard strips forming two rows of tongue-and-groove panels. Special sound seals. Either side independently movable so walls can be finished separately. Electrical and telephone services are carried in panel chaseways.

Fire rating: 1 hour
STC: 45

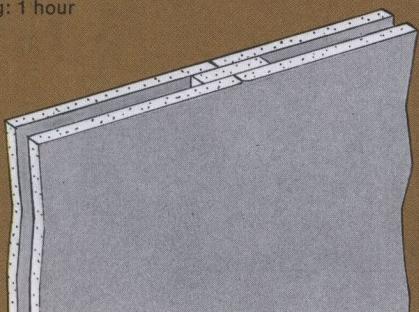


Fixed

2½-in. Chase Wall (2700 and 2900 Series)

Excellent semi-solid fixed corridor partition or tenant wall where economy and smooth surface are desired; mobility not important. Two layers SHEETROCK FIRECODE gypsum panels laminated in place to coreboard strips. Electrical and telephone services are carried in internal chaseway. 2900 Series rated as shown.

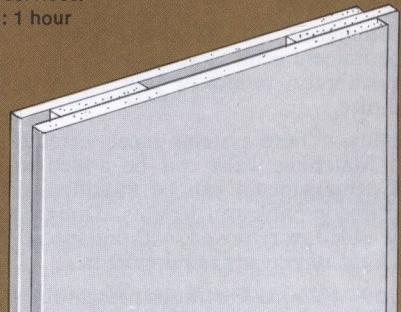
Fire rating: 1 hour
STC: 37



2½-in. Chase Wall (700 and 900 Series)

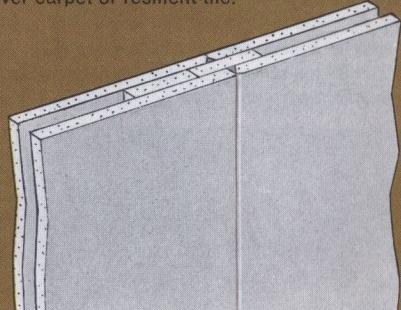
Excellent corridor partition or tenant wall preferred when economical chaseways are desired for addition of future electrical requirements. Two layers of specially engineered VAUGHAN WALLS gypsum face panels are laminated to coreboard strips forming a tongue-and-groove panel assembly. Construction provides internal chaseway for electrical and telephone services.

Fire rating: 1 hour
STC: 37



2½-in. Low Rail Partition Series

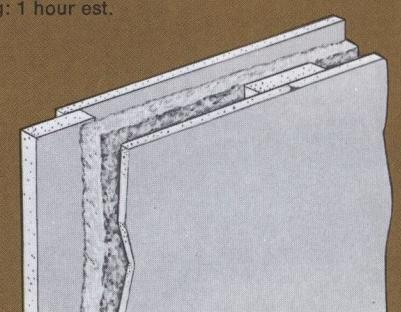
Factory-fabricated and field-assembled. Entirely self-supporting and easily moved and reassembled. Series consists of 24-in. or 30-in. wide prefinished $\frac{5}{8}$ -in. VAUGHAN WALLS bevel-edge gypsum face panels, laminated to coreboard strips forming a tongue-and-groove panel assembly. Low profile aluminum trim with black inserts in posts for accent. Installed over carpet or resilient tile.



3¾-in. Sound Wall (2700 and 2900 Series)

Excellent fixed party wall, privacy partition or conference room wall. Two rows of SHEETROCK gypsum panels laminated and stapled to coreboard strips at joints. Neoprene isolators and 1-in. insulation blankets in cavity. Electrical and telephone services are carried in internal chaseway. 2900 Series rated as shown.

Fire rating: 1 hour est.
STC: 45





Unique flexibility at low cost makes Low Rail Partitions ideal for secretarial cubicles, work stations and clerical pools. Entirely self-supporting, no permanent floor connections required. Factory-fabricated to fit modular or random layouts.



Glazed walls give executive office an inviting, open quality. Bronze framing is accented by black ceiling runner which creates visual recess between wall and ceiling.

fire and sound ratings

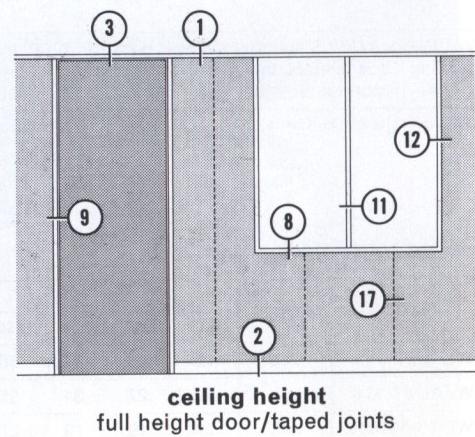
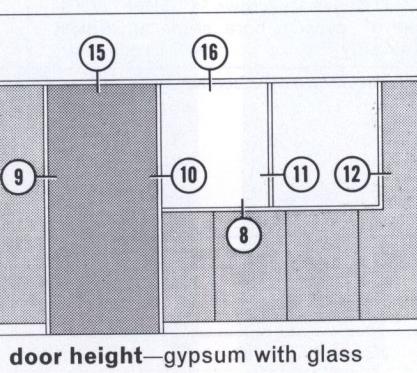
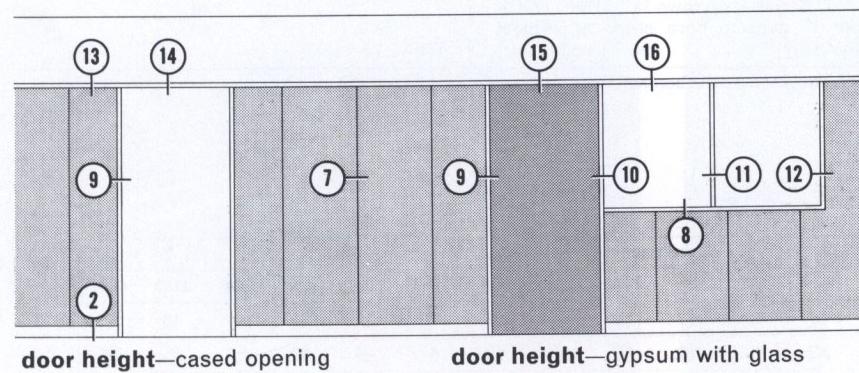
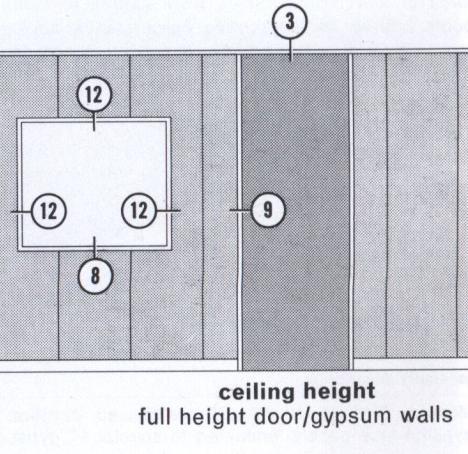
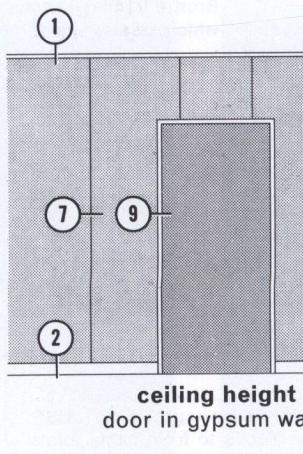
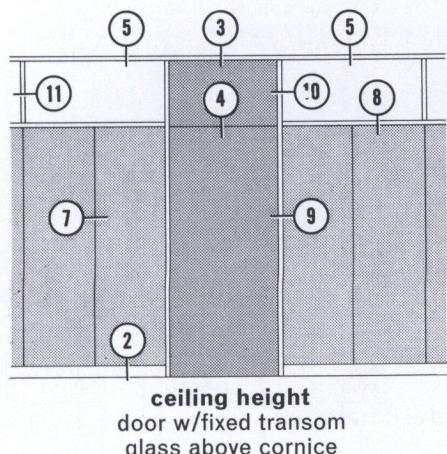
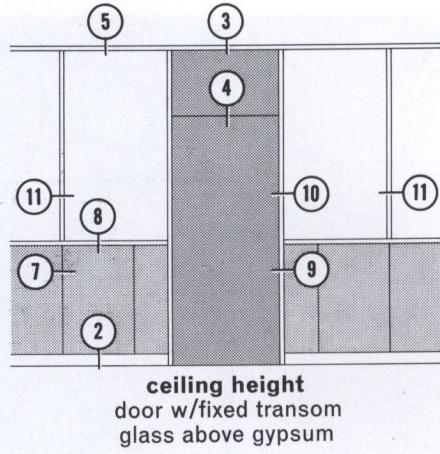
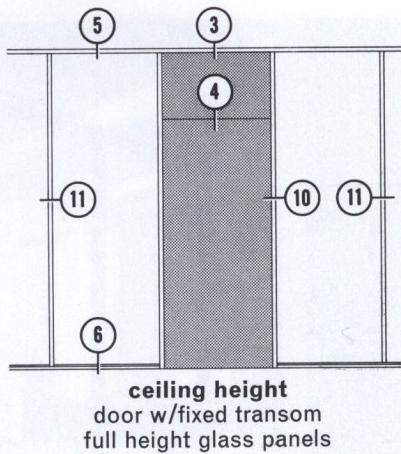
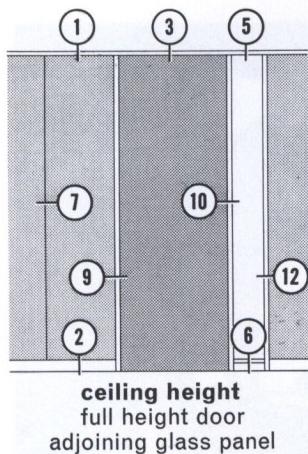
assembly description	test no.	fire rating	STC rating (16-freq.)
Movable VAUGHAN WALLS pre-chased partition 700 and 900 Series—special $\frac{5}{8}$ " USG gypsum face panels laminated to special 1" gypsum core strips placed to form panel joints wt 7 width 2 $\frac{1}{4}$ "	U of C 11-1-66(1) WL-73-59160(2)	1 hr. 1 hr.	37
VAUGHAN WALLS chase wall fixed partition 2700 and 2900 Series— $\frac{5}{8}$ " SHEETROCK FIRECODE gypsum face panels laminated to special 1" gypsum core strips at vertical joints wt 7 width 2 $\frac{1}{4}$ "	U of C 8-6-71(1) WL-73-59160(2)	1 hr. 1 hr.	37
Movable VAUGHAN WALLS pre-chased sound wall 700 and 900 Series—special $\frac{5}{8}$ " USG gypsum face panels laminated to $\frac{3}{8}$ " gypsum base layer panels— $\frac{1}{2}$ " gypsum core strips placed to form panel joints—2 rows 1 $\frac{1}{2}$ " thick—aluminum trim wt 10 width 3"	U of C 8-12-68(1) WEAL 67-131(3)	1 hr. 1 hr.	45
VAUGHAN WALLS sound wall fixed partition 2700 and 2900 Series—two rows $\frac{5}{8}$ " SHEETROCK gypsum face panels laminated and stapled to special 1" gypsum core strips at vertical joints—neoprene isolators and 1" insulation blankets in cavity wt 5 width 3 $\frac{3}{4}$ "	WEAL 72-148(3)	1 hr. est.	45

(1) University of California. (2) Wyle Laboratories. (3) Western Electro-Acoustic Laboratory, Inc.

sound transmission loss—db

test no.	method	band center frequency—Hz															STC	
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
WEAL 72-148	Lab	23	26	31	38	43	44	49	50	52	51	52	52	44	44	48	51	45
WEAL 67-131	Lab	22	27	31	35	39	43	43	45	46	48	47	46	49	52	55	56	45
WL-73-59160	Lab	24	19	19	27	32	32	36	37	40	41	42	41	38	38	39	41	37

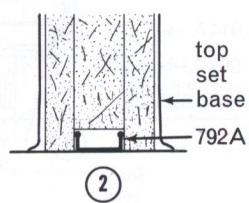
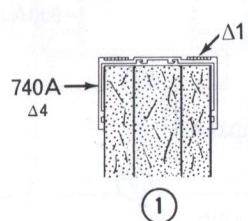
elevations



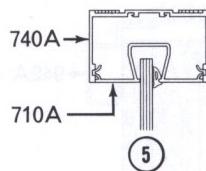
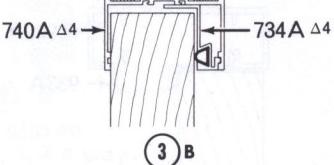
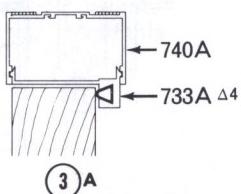
details/2½" chase wall (700 series)

VAUGHAN WALLS

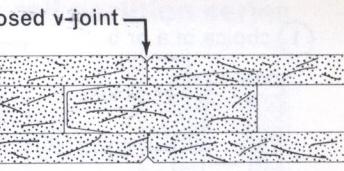
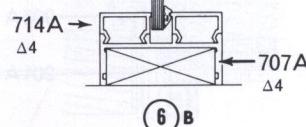
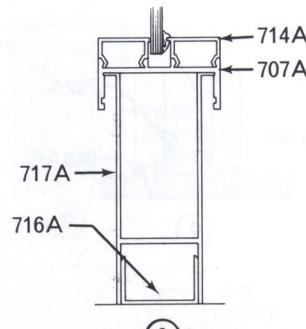
scale: 3" = 1'-0"



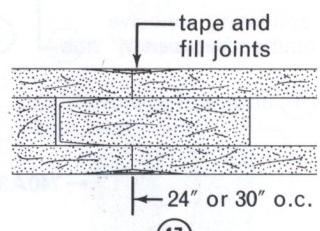
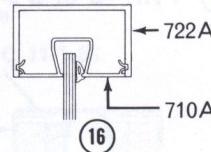
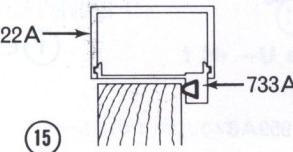
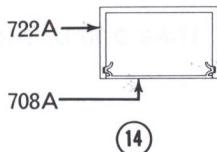
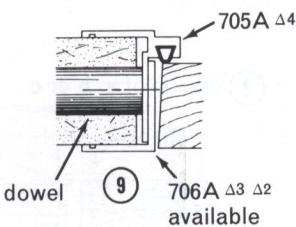
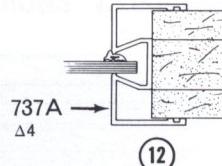
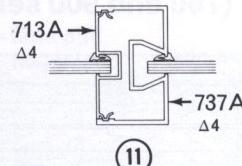
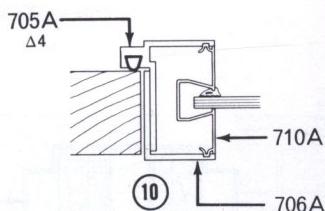
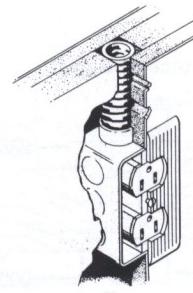
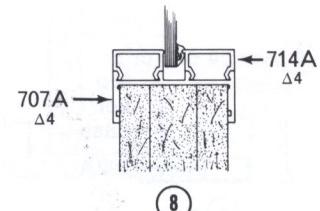
③ choice of a or b



⑥ choice of a or b



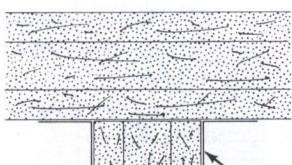
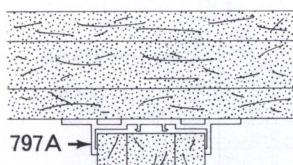
1 Hr.—U of C 11-1-66



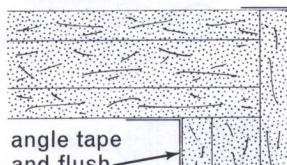
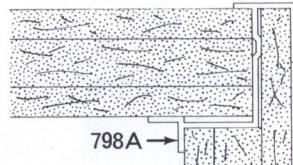
wall intersections and corners (700 and 900 series)

corner bead flushed with joint compound

1 Hr.—U of C 11-1-66

painted panels
(joints treated)

vinyl panels

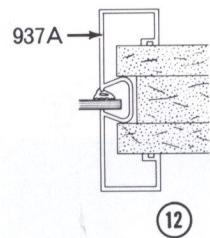
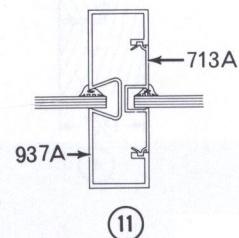
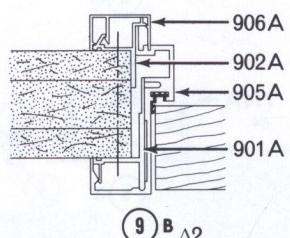
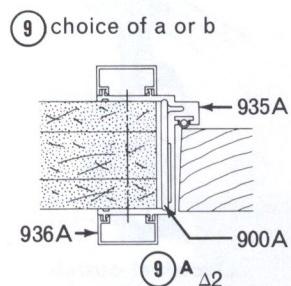
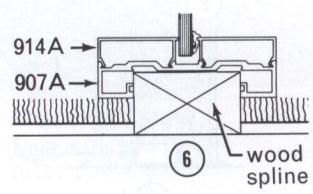
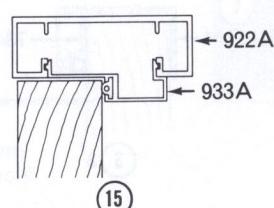
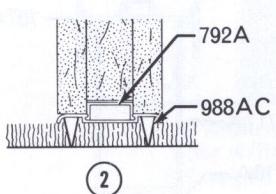
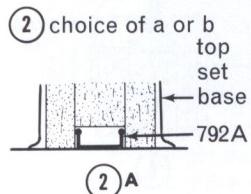
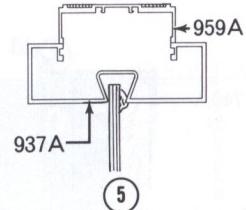
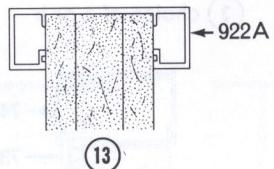
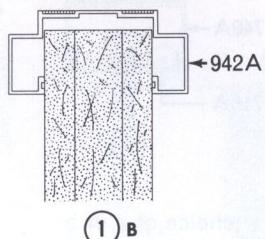
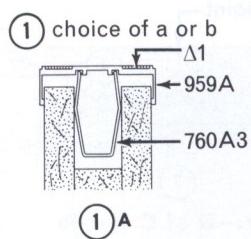
painted panels
(joints treated)

vinyl panels

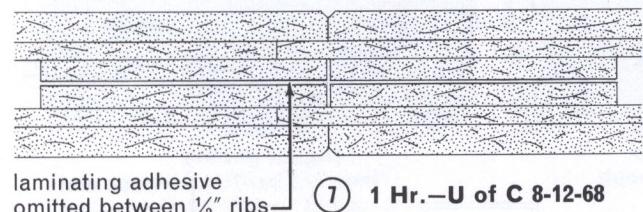
Δ1-1 1/8" Polyurethane Gasket
Δ2-30-min. ICBO ApprovalΔ3-45-min. Underwriters "C" Label
Δ4-Also available for 3" sound wall10.1/Vau
10.1/Vau
10.1/Vau

details/2½" chase wall (900 series)

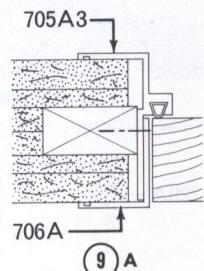
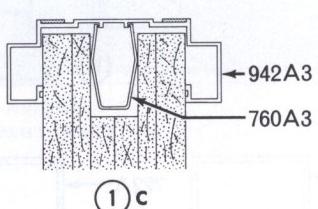
(elevation 00T) floor joists
scale: 3" = 1'-0"



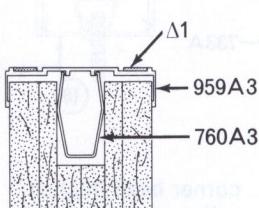
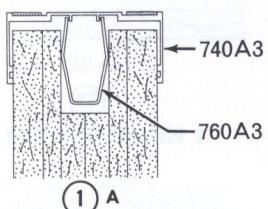
details/3" sound wall (700 and 900 series)



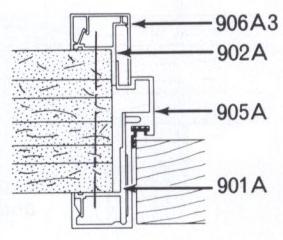
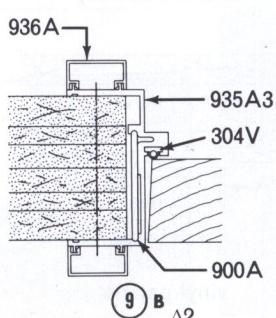
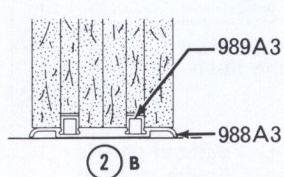
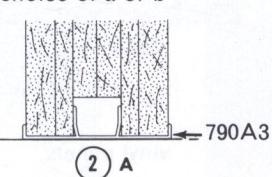
⑨ choice of a, b or c



① choice of a, b or c



② choice of a or b



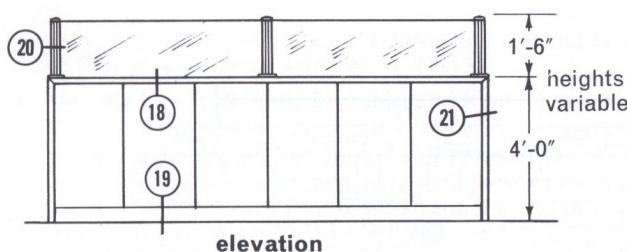
Δ1— $\frac{1}{8}$ " Polyurethane Gasket
Δ2—30-min. ICBO Approval

ICBO 705-70 Sound Wall
Floor Joists & 30 min. ICBO Approval

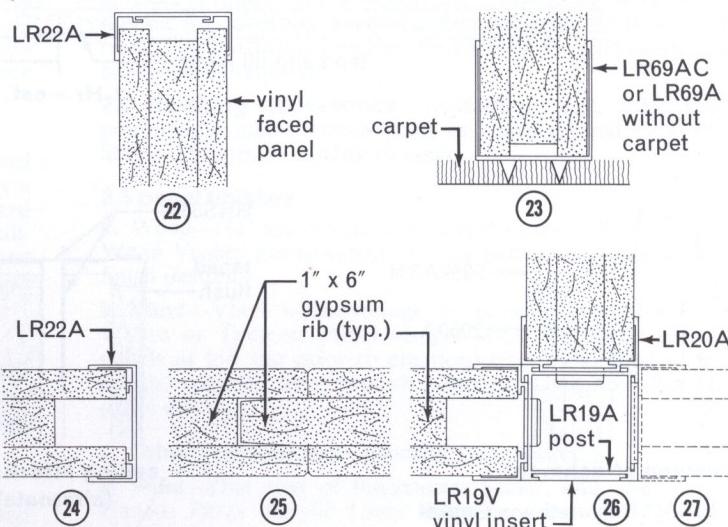
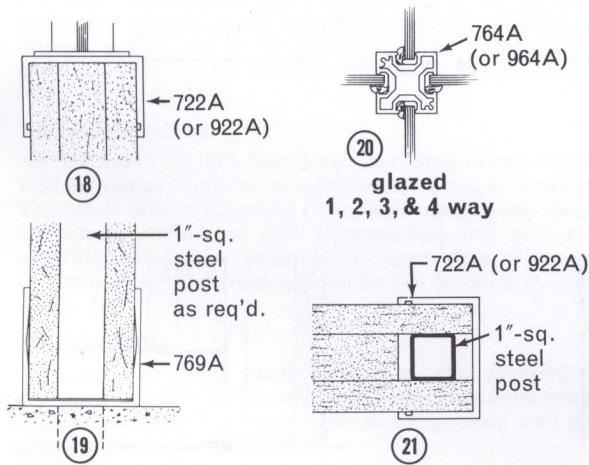
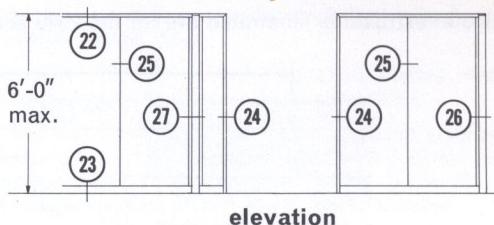
See page 7 for other 3" sound wall profiles

details/bank rail partition (700 and 900 series)

VAUGHAN WALLS



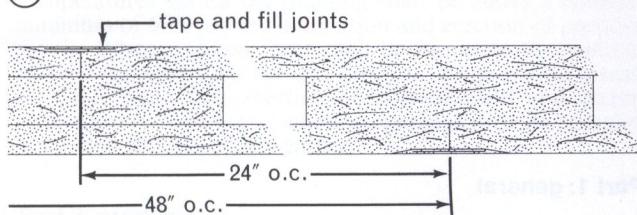
details/low rail partition series



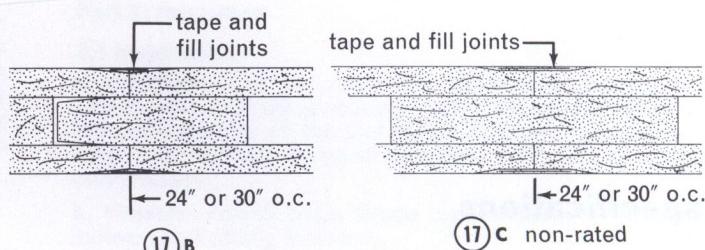
details/2 1/4" chase wall (2700 and 2900 series)

Note: extrusions illustrated are for the 2900 series

(17) choice of a, b or c

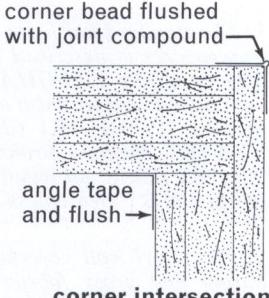


(17) A 1 Hr.-U of C 8-6-71

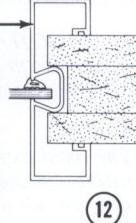
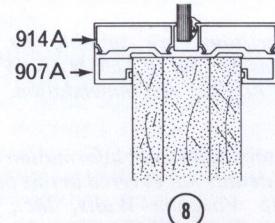
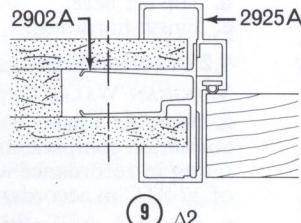
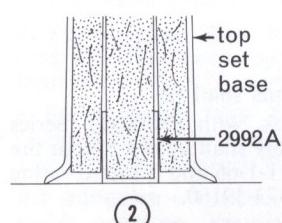
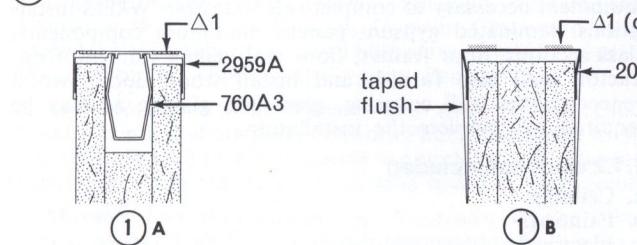


(17) B 1 Hr.-U of C 11-1-66

(17) C non-rated



(1) choice of a or b



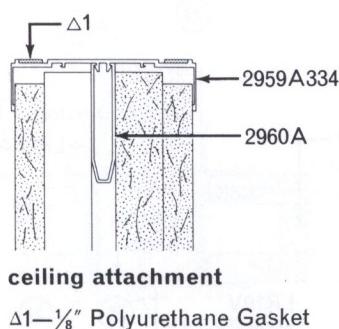
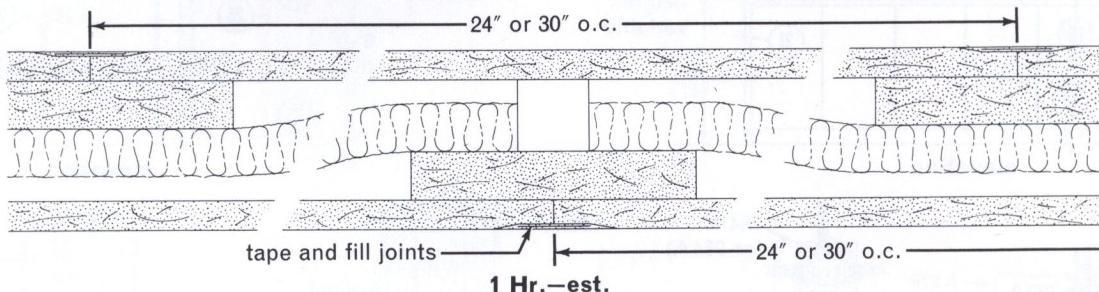
△1—1/8" Polyurethane Gasket

△2—30-min. ICBO Approval

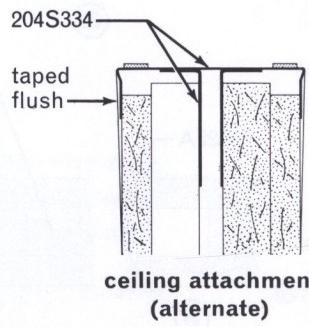
details/3¾" sound wall (2700 and 2900 series)

scale: 3" = 1'-0"

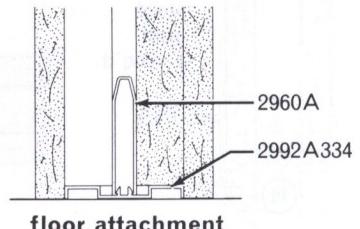
Note: extrusions illustrated are for the 2900 series



ceiling attachment



ceiling attachment (alternate)



floor attachment

specifications

notes to architect

1. The standard finish for all VAUGHAN WALLS Aluminum Components is described in Part 2. Exposed aluminum components of any VAUGHAN WALLS Series also are available with baked enamel finish or any of following optional anodized finishes: (1) V01C1R1 Clear, (2) V11C1R1 Light Bronze, (3) V12C1R1 Medium Bronze, (4) V13C1R1 Dark Bronze, (5) V5C1R1 Black. All anodized finishes include a C1 directional polish and R1 etch unless specifically excluded.
2. Any vinyl wall covering, film- or fabric-backed, and many burlap and grass fabrics can be wrapped on VAUGHAN WALLS movable panels at the factory or job site.
3. VAUGHAN WALLS Partitions are suitable for light-weight fixture attachment. Consult your VAUGHAN WALLS contractor for specific type of bracket recommendation.

The most expedient way to obtain additional information on fire ratings, sound transmission or details not covered in this publication is to direct inquiries to Vaughan Walls, Inc., 11681 San Vicente Blvd., Los Angeles, Calif. 90049, a Vaughan Walls licensed contractor or United States Gypsum sales offices.

Part 1: general

1.1 scope—Specify to meet project requirements.

1.1.1 work included

The partition contractor shall furnish all labor, materials and equipment necessary to complete all VAUGHAN WALLS installations: laminated gypsum panels, aluminum components, glass sections, door frames, floor and ceiling runners. Contractor shall also furnish and install wood doors, wood veneers, vinyl wall covering, glass and glazing as may be required to complete the installation.

1.1.2 work not included

- a. Ceilings.
- b. Painting.
- c. Electrical.
- d. Top set base.
- e. Finish hardware.

1.2 description of systems

VAUGHAN WALLS Gypsum Partitions shall be:

- a. Movable Chase Wall, 2 1/4" thick, with (700)(900) Series aluminum components. The assembly shall have a 1-hour fire rating in accordance with U of C 11-1-66 and a sound rating of 37 STC in accordance with WL-73-59160.
- b. Movable Sound Wall, 3" thick, with (700)(900) Series aluminum components. The assembly shall have a 1-hour fire

rating in accordance with U of C 8-12-68 and a sound rating of 45 STC in accordance with WEAL-67-131.

c. **Movable Low Rail Wall**, 2 $\frac{1}{4}$ " thick, with aluminum components.

d. **Fixed Chase Wall**, 2 $\frac{1}{4}$ " thick, with (2700)(2900) Series aluminum components. The assembly shall have a 1-hour fire rating in accordance with U of C 8-6-71 and a sound rating of 37 STC in accordance with WL-73-59160.

e. **Fixed Sound Wall**, 3 $\frac{3}{4}$ " thick, with (2700)(2900) Series aluminum components; cellular neoprene isolators and 1" insulation blankets in the partition cavity. (The 2900 Series assembly shall have a sound rating of 45 STC in accordance with WEAL-72-148).

1.3 qualifications

All VAUGHAN WALLS Partitions, including doors and related wall coverings, shall be installed under a single contract by a VAUGHAN WALLS Licensed Contractor employing specialized craftsmen, skilled in wall construction and custom wall-covering installation, under close supervision of experienced foremen who have received on-the-job training by Vaughan Walls, Inc.

1.4 submittals

Partition contractor shall submit to the architect detail drawings of all metal components showing attachments to adjacent work and to each other in compliance with the preceding General Conditions.

1.5 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.6 environmental conditions

Temperatures within the building shall be above a constant minimum of 55°F during lamination and erection of partition panels. When required, heat shall be furnished by (building owner) (general contractor). Erection of partition panels shall not begin until erection of exterior walls and glazing or temporary covering of exterior openings provide complete protection from outside weather.

Part 2: products

2.1 partition panels—laminated to form nominal (24") (30") wide panels as specified below:

a. **Movable Chase Wall Panels**—semi-solid, job-laminated VAUGHAN WALLS 1" x 6" nom. Gypsum Coreboard strips spaced (12") (18") apart and faced both sides with $\frac{5}{8}$ " VAUGHAN WALLS (regular) (FIRECODE) Gypsum Panels.

b. **Movable Sound Wall Panels**—two rows $\frac{5}{8}$ " VAUGHAN WALLS (regular) (FIRECODE) Gypsum Panels laminated to $\frac{5}{8}$ " VAUGHAN WALLS Gypsum Coreboard with $\frac{1}{2}$ " x 6" Gypsum Coreboard strips laminated to backing board at panel joints.

c. **Movable Low Rail Panels**— $\frac{5}{8}$ " VAUGHAN WALLS bevel-edge gypsum panels factory- or job-laminated to both sides of 1" x 6" nom. gypsum coreboard strips.

d. **Fixed Chase Wall Panels**—semi-solid, $\frac{5}{8}$ " SHEETROCK (regular) (FIRECODE) Gypsum Panels laminated-in-place to both sides of 1" x 6" (nom.) Gypsum Coreboard strips.

e. **Fixed Sound Wall Panels**—two rows $\frac{5}{8}$ " SHEETROCK Gypsum Panels, 30" wide, laminated and stapled to one side of 1" x 6" (nom.) Gypsum Coreboard strips at panel joints.

2.2 adhesive—VAUGHAN WALLS Brand W-300 Non-flammable Adhesive, VAUGHAN WALLS WR 2900 Adhesive or VAUGHAN WALLS Contact Adhesive.

2.3 aluminum components—manufactured to standards approved by Vaughan Walls, Inc.

a. **Extrusions**—5010, 6063-T5 or KB45 aluminum alloy, wall thicknesses and design to VAUGHAN WALLS standards.

b. **(Standard) Finishes**—mill finish for unexposed components; (VO1C1R1 Clear) (V12C1R1 Medium Bronze) anodized for exposed components of (700)(2700)(900)(2900) (Low Rail) Series, except ceiling runners Velvet Black baked enamel.

c. **Door Frames**—factory-mortised, reinforced, drilled and tapped for mortised hardware according to templates furnished by hardware supplier. Reinforced for surface-applied hardware as required.

2.4 finishing accessories—reinforcing tape, joint compounds and metal corner beads as manufactured by United States Gypsum Company or equal.

2.5 panel finishes

a. **Wood**—($\frac{1}{8}$ " architectural veneer) (VAUGHAN WALLS WOOD WRAP Veneer pre-wrapped on face panels). (Specify type of finish desired.)

b. **Vinyl**—Vinyl wallcoverings as selected from VAUGHAN WALLS or TEXTONE Panel sample books (wrapped on face panels at job site prior to erection) (factory-applied to face panels) (applied as a smooth continuous surface after face panel erection).

c. **Other Wallcoverings**—(Specify type desired.)

d. **Paint**—One coat of SHEETROCK Sealer, and one coat of GRAND PRIZE Acrylic Latex Paint or one coat of flat oil paint, or equal.

2.6 post insert—Black rigid vinyl (for Low Rail Series).

Part 3: execution

3.1 installation

a. **Partitions**—Lay out partitions accurately and securely anchor floor and ceiling runners. Such attachment shall assure complete security of the partition and future removal (and relocation) without excessive damage to the floor or ceiling construction.

b. **Gaskets**—Install polyurethane gaskets between all ceiling runners and ceiling materials.

c. **Partition Panels (700 or 900 Series)**—Form and laminate in special jigs to insure a constant dimension at the tongue and groove. Offset coreboard from face panels to form a tongue and groove 1 $\frac{1}{2}$ " deep. Install panels in floor and ceiling runners to form tight joints with true vertical and horizontal alignment.

d. **Partition Panels (2700 or 2900 Series)**—Install face panels vertically between floor and ceiling runners. Lamine panels in place to both sides of coreboard strips spaced (24") (30") o.c. For sound walls, laminate panels to one side of coreboard strips spaced 30" o.c. Center face layer joints over strips and stagger joints on opposite partition sides. Fasten face panels to strips with staples spaced 18" o.c. In sound walls, install 1" insulation in the cavity butting ends and edges closely together and filling all voids.

e. **Partition Panels (Low Rail Series)**—Stand four-way posts at intersections. (Attach double-faced tape to aluminum floor runner, hook runner into posts and press securely to tile or hard flooring.) (Hook special aluminum floor runner incorporating carpet "teeth" for ($\frac{1}{4}$ ")(1/2") carpet, into posts and press securely into carpeting.) Use no mechanical fasteners penetrating finish floor. Hook aluminum channels for partition intersections onto four-way post. Lift panel closest to post into base and slide into channel. Install balance of

panels progressively. Install continuous cap over panels and attach with concealed angle clips. At partition terminals, trim ends with mitered section of aluminum cap running to floor. Slide rigid black vinyl inserts into open side of four-way posts and press square caps onto top of posts.

f. Aluminum Door Frames—Assemble frames plumb and square. Fasten 700 Series frames with screws into 1" x 4" long dowels set into coreboard. Screw-attach 2700, 900 and 2900 Series frames through the panels. Anchor bottom of frames to floor runner.

g. Extrusions—Use maximum length sections and install splice plates and angles as detailed to reinforce all connections. Cut ends and miters accurately and clean to fit adjacent parts neatly.

h. Joint Compound—Apply to beveled joints of panels, to

insure proper bridging or paint. Wipe excess cement from joint, leaving a true "V" bevel.

i. Metal Corner Bead—Install at all external corners, where aluminum extrusions are not installed. Apply at least two coats of joint compound over beads and feather each coat out onto panel face.

j. Tape and Joint Compound—Apply according to manufacturer's directions to all internal corners and intersections where flush finishing is desired or metal trim is not specified.

k. Electrical Outlets—Position outlets as detailed; coordinate with the electrician.

l. Finishes—Apply wood veneer and vinyl wallcovering using adhesive approved by Vaughan Walls, Inc. Apply paint according to manufacturer's directions.

WALLS AND CEILINGS

Walls and ceilings must be smooth, clean and dry. All joints must be tight and well filled with joint compound. Paintable gypsum board must be applied to a smooth, flat surface.

a. Gypsum Board—Gypsum board must be applied to a smooth, flat surface.

b. Drywall—Drywall must be applied to a smooth, flat surface. It must be applied to a gypsum board or gypsum drywall.

c. Acoustical Plaster—Acoustical plaster must be applied to a smooth, flat surface.

d. Gypsum Plaster—Gypsum plaster must be applied to a smooth, flat surface.

e. Gypsum Lath—Gypsum lath must be applied to a smooth, flat surface.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, FIRECODE, GRAND PRIZE, SHEETROCK,

TEXTONE. VAUGHAN WALLS and WOOD WRAP are Reg. U.S. Pat. & Tm. Off. by Vaughan Walls, Inc.

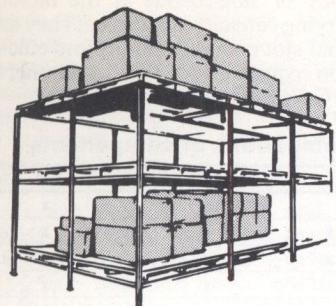
NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

VAUGHAN WALLS, INC.

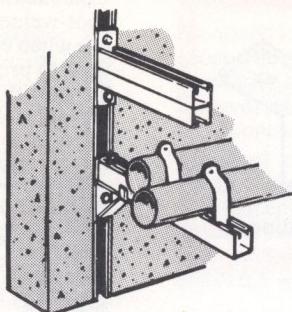
11681 San Vicente Blvd., Los Angeles, Calif. 90049

UNITED STATES GYPSUM

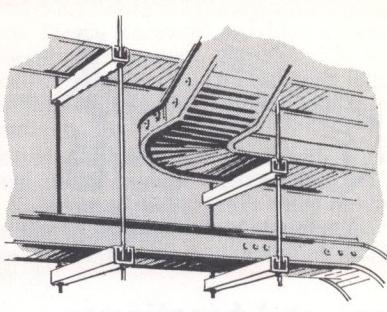
BUILDING AMERICA 101 South Wacker Drive, Chicago, Illinois 60606



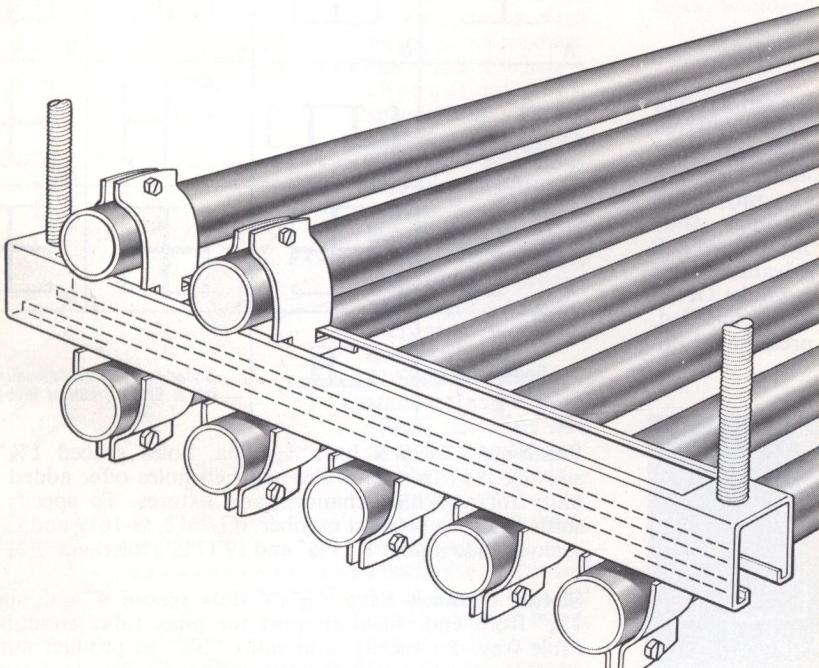
Racks



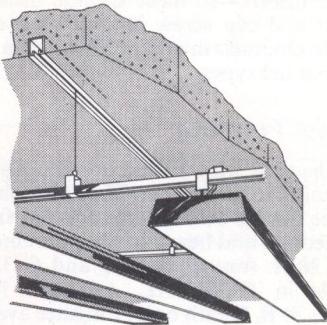
Concrete Inserts



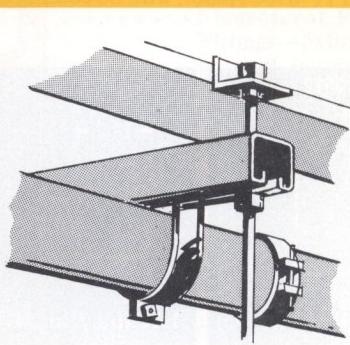
Cable Tray Supports



Double-slotted Channel



Electrical Supports



Mechanical Supports

description and utility

GLOBE-STRUT Channel Framing satisfies a broad range of needs for a bolted framing system for mechanical, electrical and industrial applications. Designed and manufactured to exacting U.S.G. standards, it simplifies and reduces cost of structural fabrication and makes possible in-plant construction of structural frames for machinery, racks and pipes. Channel framing also offers a combination accessible surface raceway and support for lighting fixtures and electrical equipment.

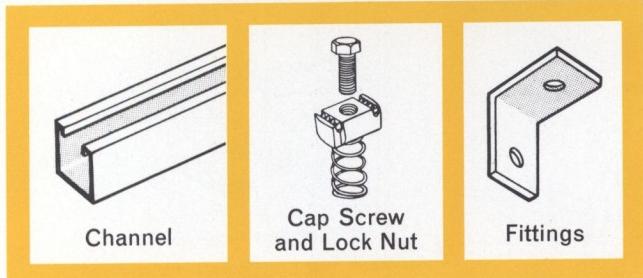
When embedded in monolithic concrete, this economical framing provides a convenient flush mounting in walls, ceilings and floors. Roll-formed steel channels and hundreds of fittings and accessories are available to provide these features:

Fast Installation—this system of metal framing is so simple, a hacksaw and wrench are the only tools required. What takes hours with welded framing often assembles in minutes with the GLOBE-STRUT System.

Positive Connections—the key element in the system is the electro-galvanized "triple grip" GLOBE-STRUT Lock Nut. Its unique curved ends permit positioning inside the channel without tools. Triple-grip holding power derives from the built-on spring that holds the nut firmly against the inside of the channel lips, grooves that embrace the lips to prevent turning, serrations within the grooves that prevent slippage.

Versatile—the number and combination of installations possible with this system are almost limitless. Best of all, when GLOBE-STRUT has served its purpose in one capacity, it can be easily dismantled and reassembled for another use.

Permanent Finish—the galvanized finish literally becomes part of the metal—resists separation when crimped or subjected to impacts, stresses or pressures. GLOBE-STRUT serves indoors or out, year after year. (Optional finishes available.)



types and functions

GLOBE-STRUT Channel Framing is available in either the basic solid continuous type or in six variations—combination, slotted, slotted-hole, double-slotted, knock-out, punch-out and concrete inserts—to meet specific uses. A specially designed lock nut and cap screw is used with appropriate fittings to assemble channels in any position or in any combination with other channel types.

Channel Framing

Basic Channels with a solid continuous web are used for general framing requirements. They are available in eight different sizes (see details below), cold-formed from mild steel to meet light, medium and heavy load requirements. Standard lengths: 10 and 20 ft. (except G-1619 and G-3219, 10 ft. only). Also available in G-5812-AL, extruded from aluminum alloy 6063-T6, 20-ft. length only. Finishes available: hot-dipped mill galvanized meeting ASTM A525; hot-dipped galvanized after fabrication meeting ASTM A153; painted with Globe Green or Globe Gray Lacquer, or Globe Red Chromate meeting Fed. Spec. TTP-636C; plain, with no coating except preservative oil.

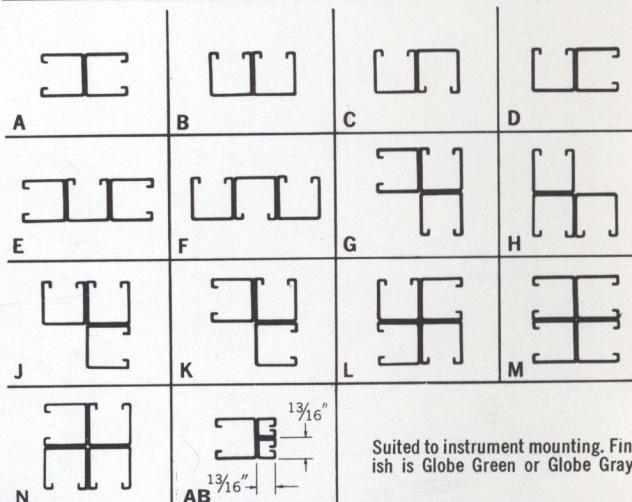
steel

G-7612	G-5812	G-5814
G-3812	G-1012	G-1315
G-1619	G-3219	aluminum G-5812-AL

Combination Channels consist of two or more basic channels spot-welded back-to-back or side-to-side at the factory for use when extra load-carrying capacity is required. They are also used to provide additional slot openings simply and efficiently. To specify type of section required, add letter to channel designation, i.e., G-5812-A, G-7612-C, etc.

available combinations of components

shape	A	B	C	D	E	F	G	H	J	K	L	M	N	AB
G-7612	X	X	X								X		X	X
G-5812	X	X	X	X	X	X	X	X	X	X	X	X	X	X
G-5814	X	X	X	X	X	X	X	X	X	X	X	X	X	X
G-3812	X	X	X								X		X	X
G-1012	X													X
G-1315	X													X
G-1619	X													X
G-3219	X													



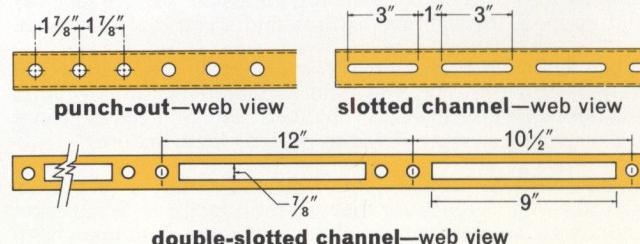
Suited to instrument mounting. Finish is Globe Green or Globe Gray.

Punch-out Channels have $\frac{9}{16}$ " dia. holes spaced $1\frac{1}{8}$ " o.c. starting $1\frac{3}{16}$ " from end. Pre-punched holes offer added flexibility for attaching channels and fixtures. To specify, add suffix "PO" to product number. (G-7612, G-1619 and G-3219 excluded.) Lengths: 9'11 3/4" and 19'11 3/4"; tolerance + $\frac{7}{8}$ ", -0".

Slotted Channels have $1\frac{15}{32}$ " x 3" slots spaced 4" o.c. starting $1\frac{1}{8}$ " from end. Ideal support for pipe, tube, conduit and cable tray. To specify, add suffix "SL" to product number. (G-7612, G-1619 and G-3219 excluded.) Standard lengths: 9'11 3/4" and 19'11 3/4"; tolerance + $\frac{7}{8}$ ", -0".

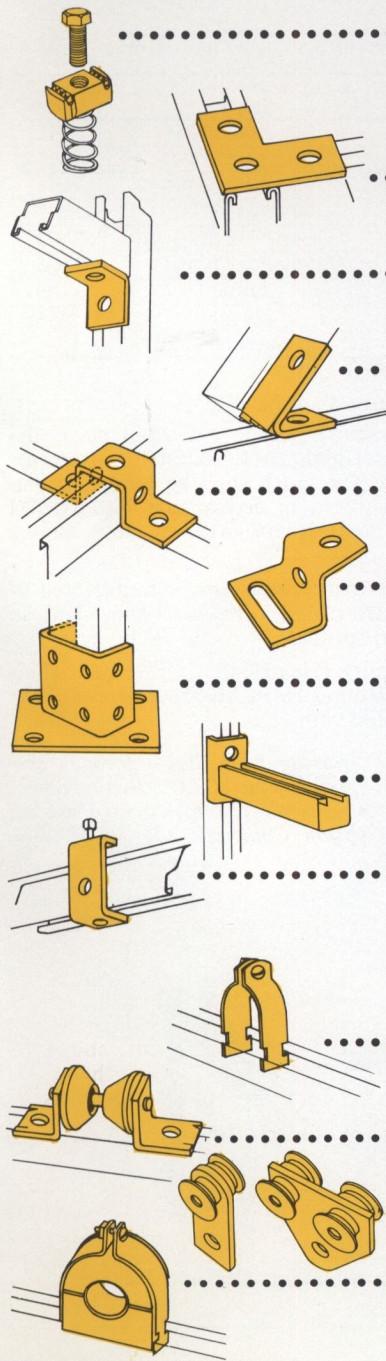
Slotted-hole Channels have $\frac{9}{16}$ " dia. x $\frac{7}{8}$ " slotted holes spaced 2" o.c. starting 1" from end. Slotted holes allow minor bolt adjustment, match spacing on many fittings. To specify, add suffix "SH" to product number. (G-7612, G-1619 and G-3219 excluded.) Length: 19'11 3/4"; tolerance + $\frac{7}{8}$ ", -0".

Double-slotted Channels made from G-5812 channel, have $\frac{7}{8}$ " x 9" slots plus two $\frac{9}{16}$ " round holes per 12"-length. Double slots permit positioning pipe, tube and conduit above and below support. Specify G-5812-DS. Standard length: 10'0 1/16" and in 1-ft. increments up to 10 ft.; tolerance + $\frac{1}{4}$ ", -0".



Fittings

Hundreds of fittings, brackets, clamps and fasteners are available to meet various framing needs. They serve multiple functions and eliminate the need for special parts. Fittings are designed for channels with $\frac{7}{8}$ "-wide slot and are interchangeable with many other brands. They are made of $\frac{1}{4}'' \times 1\frac{5}{8}''$ hot-rolled steel, pickled and oiled with $\frac{9}{16}$ " dia. holes, $1\frac{3}{16}$ " from ends and $1\frac{1}{8}$ " o.c., unless otherwise specified. Selected flat plate and 90° angle fittings, screws and lock nuts are available for G-1619 and G-3219 channels with $1\frac{3}{16}$ "-wide slot. These fittings are made of $\frac{1}{8}'' \times 1\frac{13}{16}''$ hot-rolled steel, pickled and oiled with $\frac{9}{32}$ " dia. holes, $1\frac{3}{32}$ " from ends and $1\frac{1}{16}$ " o.c. Standard finish: electro-galvanized after fabrication. Basic fittings are described below; consult GLOBE-STRUT Channel Framing literature for specific details, sizes and lengths.



- **Hardware**—lock stud, coupling, universal lock nuts, standard bolts, screws, set screws, nuts, flat washers, lockwashers.
- **Flat Plate Fittings**—channel washers, splices, tees, angles, gussets, swivel plates.
- **90° Angle Fittings**—standard, adjustable, webbed corner angles; bent tees; shelf gussets.
- **Bent-Strap Angle Connectors**—closed and open types, adjustable to full quadrant range.
- **U-Shaped Fittings**—standard and webbed front, one-side and two-side connectors.
- **Z-Shaped Fittings**—channel supports, adjustable anchors, furring spacers.
- **Post Bases**—short and tall single- and double-column bases, center bolt bases.
- **Brackets**—stair, shelf and channel brackets; braces; pipe-axle supports.
- **Beam Clamps**—many types for channel attachment to beam flange, clamps for fixed or swivel hanger rods for 3,400-lb. loads.
- **Pipe Clamps**—for thin-wall conduit, for heavy-wall conduit and pipe to 8" o.d.
- **Pipe Rollers**—60° roller, axle type, adjustable.
- **Trolleys**—single and double trolleys with needle bearings.
- **Cable Clamps**—porcelain and maple cable clamps and saddles, maple bus bar clamps.

Electrical Raceway and Fittings

GLOBE-STRUT Surface Metal Raceway provides a versatile accessible interior distribution system, for electrical equipment and communication services. When used with lighting, it serves as an economical combination support and raceway for fluorescent fixtures.

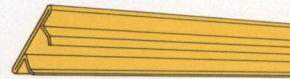
Standard or Knock-out Channels are used with Channel Closure Strips, fittings and accessories. GLOBE-STRUT Channels (except G-7612, G-1619 and G-3219) are listed in Underwriters Laboratories Inc. Construction Materials List, Surface Metal Raceway (360 A19) Section. Labeled products available when required.

Knock-out Channels have $\frac{3}{8}$ " dia. knock-outs 6" o.c. starting 3" from the end. To specify, add suffix "KO" to product number. (G-7612, G-1619 and G-3219 excluded.) Standard lengths $10'0\frac{1}{16}"$ and $20'0\frac{3}{8}"$; tolerance $+\frac{1}{4}"$, $-\frac{1}{8}"$.

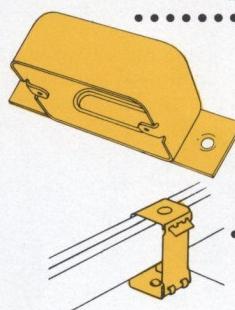
Channel Closure Strips convert channel for raceway applications: G-5800, cold-formed from 20-ga. galvanized steel; G-5800-AL extruded from 6063-T6 alloy aluminum; .010" thick. Standard length: 10'0".



knock-out channel—web view

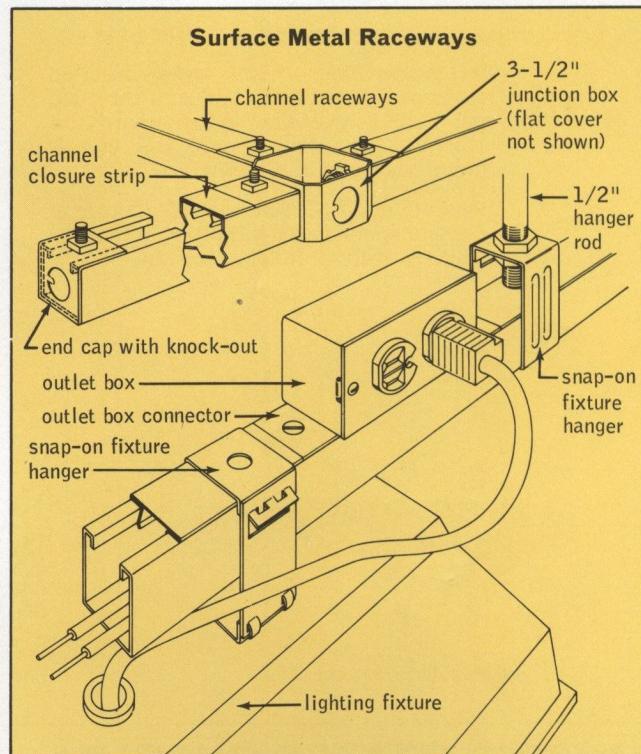


channel closure strip



• **Raceway Fittings**—end cap, plain or with knock-outs; splice plate; aluminum nipple and lock nut; outlet box connector; receptacle box; 1-, 2-, 3-, 4-way junction boxes.

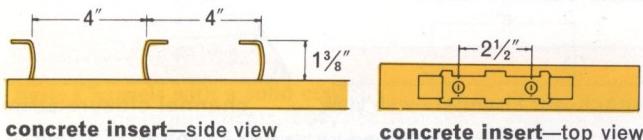
• **Fluorescent Fixture Fittings**—fixture and channel hangers, fixture and hanger fasteners.



Concrete Inserts

Continuous Concrete Inserts, attached to the pouring face of forms, provide a permanent, continuous mounting slot flush with the concrete surface. A punched portion of the channel web provides protruding "ears" for wire-tying reinforcing bars and mechanical anchorage in the concrete. A plate fills the void created by the "ear" opening to keep concrete from seeping into the channel. Two $\frac{3}{16}$ " knock-outs in the plate permit nailing to the forms. Inserts are furnished either ready-to-use, with end caps and closure tape installed, or with caps and tape separately for field-cut lengths. Tape is easily removed after forms are stripped. The continuous slot, flush with the surface, is then available—in ceilings for hanger rods, in walls or tunnels for racks to carry piping or electrical equipment, and in floors for anchorage.

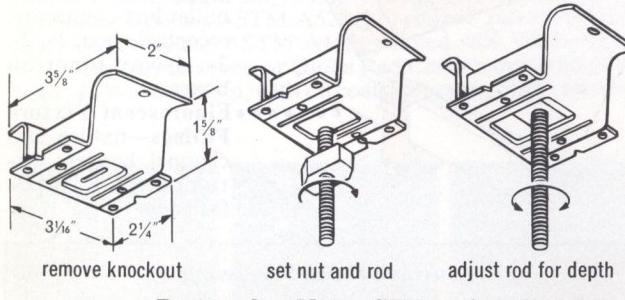
CI-5814 Series Concrete Inserts are made from G-5814 Channel; CI-5812 from G-5812; CI-3812 from G-3812; CI-1315 from G-1315; CI-1012 from G-1012 (see page 2, for basic sizes). Lengths: 20', 18', 16', 14', 12', 10', 8', 6'8", 6', 4', 40", 32", 24", 16", 12", and 8".



concrete insert—side view

concrete insert—top view

Concrete Spot Inserts, CSI, also available where continuous inserts not required. Easily removed slotted knock-out allows insertion of square or rectangular nuts for threaded rod.



Rectangular Nuts—CRN series—Inserted into spot inserts on the end of a threaded rod. A simple twist after insertion turns nut crossways, securing it until rod end is turned against roof of insert.



Square Nuts—CSN series—Will not turn in concrete spot insert, permitting rod to be tightened without holding the nut.



nail insert to pouring face of form

wire-tie reinforcing to "ears"

remove tape after forms stripped

specifications

channel framing

All channel framing shall be GLOBE-STRUT, as manufactured by the Metal Products Division of United States Gypsum Company.

The GLOBE-STRUT straight sections shall be cold roll-formed from mild steel or extruded aluminum. The finish shall be (hot-dip mill-galvanized in accordance with ASTM Designation A525) (hot-dip galvanized after fabrication in accordance with ASTM Designation A153) (painted with Globe Green, Globe Gray Lacquer, or Globe Red Chromate after a thorough cleaning and coating with phosphate crystals to assure paint bond) (plain, without any coating except preservative oil).

The size of the straight sections shall be as follows:

design- nation	cross section	length	gauge
G-7612	2 7/16" x 1 1/8"	10' 0 1/16" and 20' 0 3/8"	#12
G-5812	1 1/8" x 1 1/8"	10' 0 1/16" and 20' 0 3/8"	#12
G-5814	1 1/8" x 1 1/8"	10' 0 1/16" and 20' 0 3/8"	#14
G-3812	1 3/8" x 1 1/8"	10' 0 1/16" and 20' 0 3/8"	#12
G-1012	1" x 1 1/8"	10' 0 1/16" and 20' 0 3/8"	#12
G-1315	1 3/16" x 1 1/8"	10' 0 1/16" and 20' 0 3/8"	#15
G-1619	1 3/16" x 1 3/16"	10' 0 1/16"	#19
G-3219	1 3/32" x 1 3/16"	10' 0 1/16"	#19
G-5812-AL	1 1/8" x 1 1/8"	20' only, extruded from 6063-T6	—

The tolerance on all lengths shall be $+1/4" - 0"$

Fittings shall be GLOBE-STRUT fittings and shall be as described in the GLOBE-STRUT Catalog or the latest improvements in the GLOBE-STRUT line. The finish shall be (electro-galvanized) (hot dip mill-galvanized in accordance with ASTM Designation A525) (painted) (plain, without any coating except preservation oil).

Lock nuts shall be GLOBE-STRUT lock nuts, manufactured of hot-rolled steel and electro-plated with zinc. They shall be furnished (with) (without) springs.

Bolts shall be GLOBE-STRUT (Hex-Head Cap Screws) (Flat Head Machine Screws) (Round Head Machine Screws). The finish shall be electro-plated with zinc.

GLOBE-STRUT Channel Framing is available through distributors in principal cities. Consult your U.S.G. Division representative for information, or write directly to: Metal Products Division, United States Gypsum Company, 101 So. Wacker Dr., Chicago, Ill. 60606.